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DATA STATEMENTS

Lighthearted Pleasures

Although this isn't really the time of year for masses of games releases there are still quite a few new titles around for you to choose from

Sky Runner for the C64 from Cascade Software (£9 95 cassette, £12 95 disk) is a futuristic game which deals with drug wars The drug is Sky which makes the population completely docile Your job is to terminate the drug harvesting operation and thus free the populus from their soul destroying existence

According to the authors the game was inspired by such movies as *Dune* and *Return of the Jedi* and is the culmination of several month's work It was launched in the new year

On a completely different historical level, *The Three Musketeers*, a new game from Swedish Software House Computer Novels The new game is available for the C64, C128 (with enhanced graphics) and the Amiga Tape version is priced at £9 95, the 8-bit version on disk at £14 95 and there is even a 32-bit disk version at £24 95 The well known Three Musketeers story is the theme and the setting is 17th century France in turmoil The game is built up around digitised pictures and contains six original music scores

If you think that this all sounds a bit tame then maybe you d rather have a go at Blood 'n Guts for the C64 (£9 95 tape and £14 95 disk) This is an ancient barabrian dacathlon game which features such imaginative events as ale drinking, human fitting and even cat throwing Probably not recommended for the faint hearted

Touchline

Cascade Games Harrogate N Yorks Tel. 0423 525325 American Action and Computer Novels Box 10090 S 200 43 Malmo Sweden Tel. (+46) 40 23 25 20

Sport Simulations

New from US Gold is a 10 pin bowling simulation entitled *10th Frame* The game is by the authors of *Leaderboard* and aims to recreate the fun on 10 pin bowling for all the family

Select league play and you can take the option of playing in teams of up to four people, or open bowling will allow up to eight individual players

Features include scoreboard printout automatic scoring, power and hook control outstanding sound and pin action several different skill levels

Its available for the C64 and will be released shortly on the Amiga

On a totally different level

DATA STATEMENTS

Caption

Konami is releasing *WEC Le Mans 24*, a fast racing car simulation Look out for more details

Touchline

US Gold *Units 2/3 Halford Way Holford Birmingham B6 7AX* ***Tel*** *021 356 3388* ***Konami*** *Nemesis Bank Buildings Bank Street Newton Abbot, Devon TQ12 2JL*

Pet Revival

Owners of PET computers have responded enthusiastically to the news that Supersoft is spearheading a revival of this once popular Commodore machine

Caption

Supersoft bought up Commodore's last remaining stocks of the PET range in 1986 Since then enquiries from existing users have been flooding in

However most of the stocks purchased were the older 4032 and 8032 computers and many users who enquired were hoping to expand their systems with the 8296 computers the last produced in the PET range

Supersoft has now managed to locate stores of brand new 8296 computers in a Commodore warehouse in Europe These have now been imported and are available from Supersoft at a price of £595 plus VAT

Hewson Future

Hot on the heels of the new year Hewson is releasing a new C64 title Named *Ranarama* it's due out at the end of March and is a multi-level game combining strategy and basic shoot em up in order to appeal to all games fans

The game is set in a labyrinth of rooms viewed from above Intrigue and suspense is added since the rooms only become visible upon being entered

You control Mervyn a sorceror's apprentice who has evaded the evil warlocks by turning himself into a frog whilst trying to concoct a body-building potion You must combat 12 guarded wizards on each of eight levels to obtain missiles power and shields

Ranarama was written by Steve Turner a regular Hewson programs who has written several very popular games including *Dragontorc Avalon Astro Clone* and more recently *Quasatron*

Touchline

Hewson *56b Milton Trading Estate Milton Abingdon Oxon OX14 4RX* ***Tel*** *0235 832939*

Welsh Winners

Konix the company which produced the *Speed King* Joystick has been awarded the New Enterprise Award in the Welsh National Business Awards 1986

The award was presented to the managing director of Konix, Wyn Holloway (left of picture), by Sir John Harvey-Jones the chairman of ICI and was won just over 18 months after the company was formed

Konix was the only company to reach three finals, the Design Technology Award, the New Enterprise Award and the Business Achievement of the year Competing companies included Laura Ashley and British Aerospace

Touchline

Konix *Unit 13 Sirhowy Hill Industrial Estate Tredegar Gwent NP24QZ* ***Tel*** *049525 5913*

Caption

DATA STATEMENTS

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Sport on Channel 64

Sport games have been an immensely popular area of software ever since the first crude ping pong. Here's a round up of the best simulations

By Tony Hetherington

If you're fed up with watching Liverpool playing every weekend, Steve Davis winning another match or yet another contest between Cram, Coe and Ovett then why not tune into Channel 64. We've got over 40 sporting challenges ranging from world football to America's cup racing.

Multiple Events

Activision released *Decathlon* in 1983 which was quickly followed by Ocean's *Daley Thompson's Decathlon*. The race to the Olympics was on. Both featured the 10 gruelling events that form the Olympic Decathlon. *Decathlon* was the more accurate simulation as each competitor frantically waggled his joystick in all 10 events where as Ocean's game demanded success in one event before you could compete in the next.

Now joystick athletes can tackle the sprints and hurdles of *Summer Games* (seven events), high jump, equestrian and canoeing of Summer Games II (another seven events), the superb bobsled, ski jump, hot dog aerial skating and biathlon of *Winter Games* (six excellent events), the round the world tour of logging rolling barrel jumping, weight lifting and sumo wrestling of *World Games* (eight events) and the budget priced sprinting, archery and diving of *Go for Gold* (seven events). All of these are from US Gold.

Soccer

Football fans had a field day last year with the World Cup in Mexico and we feature five football games. The first was the literally basic conversion of the Spectrum hit *Football Manager* by Addictive Games that has been recently re-released. Unfortunately, C64 owners expected more of a game than their rubber keyed cousins and it failed to score.

The best C64 football game is still Commodore's own *International Soccer*. Its simple gameplay lets you control the action against either human or nine computer opponents. The system is simple as you control the man that is nearest to the ball with the computer controlling all the other ball running".

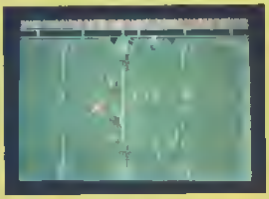
World Cup Carnival caused the greatest uproar from the crowd when it was released in time to capitalise on the World cup fever. Promising a badge, poster and a game that took six months to develop. However on release the game looked too familiar and turned out to be a slightly revamped version of Artic's *World Cup III*. This earned US Gold a yellow card and boosted sales of *New Games 2* that also carried Artic's game.

After the World Cup the papers were dominated by the incident when Diego Maradona punched the ball past Peter Shilton to knock England and out of the cup. Now that moment has been immortalised in Grandslam's (Argus) *Peter Shilton's Handball Maradona* game. However, the game itself is dull and uninspiring although it does contain the classic phrase "a game of two halves" in its instructions.

Gremlins new *Footballer of the Year* shows more promise as you battle your way through poverty, low divisions and defences in your struggle to become the best footballer of the year. The game plays a computerised board game with goal attempts coming from bought goal cards and transfers, pools wins and business profits from chance "incident" cards. Despite a few annoying bugs such as league goals being counted twice in your tally the game is ridiculously addictive.

American Football

Football fans who enjoy the game American style can re-create the 1986 Super Bowl when the Bears destroyed the patriots in Ocean's *Super Bowl* as well as play individual games in Bug Bytes budget *American Football*, Ariolasoft's *Touchdown Football* and *The Nexus Super Bowl Sunday*. You can also recreate the entire season in the gridiron version of Addictive's Football Manager, *Heads coach*.



M[illegible] the launch s *Super Bowl Sun[illegible]* [illegible] some complex accurate statistics in a highly plausible form for a selection of football s greatest teams Now you can be crunched by Chicago s 86 defence, throw touchdown passes with Dan Marino and the 82 Miami Dolphins and watch as John Riggens rips through defences to lead the Redskins to victory

Baseball

US Football's American brother baseball is also well represented as digital pitchers and hitters can argue over the strikes balls base hits and home runs in *Hardball* (US Gold/Accolade) *World Series Baseball* (Imagine) and Activision s *Star League Baseball*

Accolade s debut game *Hardball* is the leader both in graphics and gameplay giving novice and expert a run for their money Simple joystick moves select from the available sinkers fastballs, curveballs sliders and changeups that the hitter must bat over the fence for a home run Nine innings of non-stop action

Golf

Golf has never been my favourite sport and has always prompted me to swap channels but Channel 64 has two hardhitting heroes, Ariolasoft s simulation *Golf Construction Set* and the "hit and see" action of US Gold's (Access) *Leader Board*

The GCS golfer selects his clubs and then battles against his own handicap on one of four accurately simulated courses represented on screen both as a plan to choose your shot and a 3D view of the action

There is nothing realistic about the *Leader Board* courses as they consist of a series of islands surrounded by ball chomping lakes Both games are fun to play and better than the sport they represent GCS is the more accurate game and suitable for a lengthy campaign to reduce your handicap from beginner (28) down to pro (0) *Leader Board* fans that drove the game to the top of the charts can replay all their best shots as US Gold releases four more courses in its *Leader Board Tournament* expansion set

There are other golf games such as Mastertronic s budget *Hole in One* and the Argus *Nick Faldo Plays the Open* but *Leader Board* and GCS are the clear leaders

Cricket

Two famous names battled it out for the cricket honours as *Graham Gooch s Test Cricket* (Audiogenic) took on Ian s it s *Ian Botham*

I found Botham's to be the better game once you d [illegible] yourself in but poor graphics let the appalling Gooch [illegible] take the honours The graphics are quite impressive but soon lose their appeal as you realise they are just a series [illegible] The [illegible] simulation mode is the [illegible] play and win while you re asleep! How well [illegible] in the arcade version depends solely on the skill level Choose the highest and you'll be all out in two overs but at the lowest you can score fours and sixes off your bat [illegible] and noise!

And the others

For a change from the popular sports why not try wrestling in Melbourne House s *Rock N Wrestle* that features 25 bone crushing moves in another game that outclasses it's sport The same is also true of Activision's *Two on Two Basketball* that adds excitement to a dreary sport or *Bump Set and Spike* your way through a volleyball match courtesy of Mastertronic or punch your opponent into a pulp in *Frank Bruno s Boxing* (Elite – now available as part of Hitpack) *Barry McGuigan s World Championship Boxing* (Activision) and US Gold s *Fight Night* in the pick of the pugilists

Whatever your sport you re sure to find a game to recreate your favourite heroics even yachting (*America s Cup* US Gold) table tennis (*Superstar Ping Pong* – US Gold) and *Ice Hockey* (from Anco)

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Spelling Checker

An ingenious program to help you provide yourself with a personalised dictionary to avoid those embarrassing mistakes

By W.I. Sellers

Proof reading a word-processed document is probably not most people's idea of an enjoyable way of spending an hour or so. Thus, any device that can make this job even a little easier is to be welcomed.

A spelling checker helps by comparing every word in the document with a list of common words, and indicating any that it does not find. This is obviously not infallible since the mistyping of a word can produce another word that will be recognized by the spelling checker and so the mistake will not be spotted. Also, it is not possible for the machine to know every word, therefore uncommon words will always be indicated as misspelled.

Normally, this is not the sort of program that can be typed in from a listing in a magazine since the on-line dictionary will contain several thousand words. However, this program is self teaching and can quickly obtain words for its list from documents it is used to check. This is achieved by allowing the user to ask the computer to remember correctly spelled words that it does not yet know. In this way the computer gets its word list without the user needing to type in any extra words at all.

In Use

The program shown is for use with a disk drive and running it causes a machine code program called SPELLCHECK to be created. To run the program type LOAD "SPELLCHECK",8,1 and then RUN it. The following menu will appear:

(1) Spelling check
(2) Options
(3) Load Dictionary
(4) Save Dictionary
(5) Delete Word
(6) Directory

SPELLING CHECK prompts for a filename and proceeds to perform a spelling check on that file. OPTIONS allows the user to set up spelling check parameters. Thus the option to add words to the dictionary can be selected, whether or not a printout of the misspelt words is required, and whether the file is Plus/4 built in word processor format or standard ASCII. The LOAD and SAVE DICTIONARY options are for (believe it or not) loading and saving dictionary files. DELETE WORD allows the user to delete an unwanted word from the dictionary – a misspelling that has got in by mistake perhaps. Directory prints out the disk directory.

On first running the spelling checker, the dictionary is empty and so it is necessary to type '2' to get to the OPTIONS menu. Typing the relevant letter will toggle the parameter: thus pressing 'C' will switch the program to add word mode. Then type 'D' to exit back to the main menu and then press '1' to initiate the spelling checker. This prompts for the name of the file to be checked.

When a word is not found, you are asked whether or not it is to be added to the dictionary. Going through a few lengthy files, getting the computer to add any not too esoteric words to its dictionary will rapidly generate a sizeable list of words that can now be saved as a dictionary file. This can be added each time a file is spelling checked until the limit set by the memory size of the Plus/4 – about 58K bytes or around 7000 words. If these words have been fairly carefully selected, then most words that the checker fails to recognise will indeed be errors. YC

```
PROGRAM: CHECKER CREATOR

10 OPENE,8,8,"SPELLCHECK P,W"
20 PRINT#8 CHR$(1),CHR$(16),
30 O=4857 L=140
40 I=0
50 FORX=1TO8
60 READA IFA=-1THEN110
70 PRINT#8,CHR$(A), D=D+1 I=I
+A
80 NEXT
90 READA IFA=-1THEN110 ELSEIF
I<>ATHENPRINT"ERROR IN LINE "
,L GOTO120
100 L=L+10 GOTO40
110 IFD<>5056+ITHENPRINT"ADDR
ESS ERROR" GOTO120
120 CLOSE8
130 END
140 DATA11,16,10,0,156 52,43,
48,344
150 DATA57,0,0,0,169,0,141,24
,306
160 DATA255 141,25,255,162,91
,160,16,1185
170 DATA32,185,22,32,220 255
201,49,524
180 DATA200,5,32,239,19,76,21
,16,617
190 DATA201,50,208 6 32,185,1
```

```
7,76,696
200 DATA21,16,201,51,208,6,32
,132,667
210 DATA15,76,21,16,201,52,20
0,6,583
220 DATA32,110,10,76 21,16,20
1,53 535
230 DATA208,6,32,246,10 76,21
,16,823
240 DATA201,54,208 198,32,52,
17,76,839
250 DATA21 16,150,147 13,13,1
3,32,413
260 DATA32,32,32,32,32,32,32,
32,256
270 DATA32,77,65,70,85,50,13,
13,425
280 DATA13,32,32 32,32,32,32,
32 237
290 DATA32,32,32 40,45 41,32,
83 341
300 DATA80,69,76,76,73,70,71,
32,555
310 DATA67,72,69,67,75 13,13,
32 408
320 DATA32,32,32 32,32 32,32,
32,256
330 DATA32,40,50,41 32,75,80,
84,430
340 DATA73,75,78,83,13,13 32
32,403
350 DATA32,32,32,32 32,32,32,
32,256
360 DATA40 51,41,32 76 75,65,
68,452
370 DATA32 68,73,67,84 73,75,
78,554
380 DATA65,82,85,13,13 32 32,
32,358
390 DATA32 32,32,32,32,32,32,
40,264
400 DATA52,41,32 83,65 86 69,
32,460
410 DATA68 73,67,84,73 75,78,
85,507
420 DATA82 85,13,13,32,32 32
32 325
430 DATA32,32,32,32 32,32,40,
53 285
440 DATA41,32,68,65 76,69,84
83,508
450 DATA32 87,75 82,68 13,13,
32 406
460 DATA32,32,32,32,32,32,32,
32 256
470 DATA32,40,54,41,32,68,73
82 422
480 DATA65,67,84,75,82,69,13,
13,456
490 DATA13,32,32 32 32 32,32,
32,237
500 DATA32,32,32,83 69,76,69
57 460
510 DATA84,32,70,85,78,67,84
73,573
520 DATA79,78,0,169,147,32 21
0,255 570
530 DATA32,188 208,32,64,17 9
6,162 791
540 DATA79,160 17,32,105,22,3
2,228,675
550 DATA255,201,32 208,245 96
,13,13,1067
560 DATA80,82,65,83 83,32,83,
80,582
570 DATA85,67,65,32,84,79,32,
67,495
580 DATA79,78,84,73,70,85,65
13 555
590 DATA0,162 208,160,17,32,1
05 22,706
600 DATA162,56,160,22 32,84 1
6,162 736
610 DATA237,160,17,32,105,22,
162 85,830
620 DATA160 22,32,84,10 162,0
,160 646
630 DATA10,32,105,22,162,94,1
60 22,615
640 DATA32,84 10,162,35,160 1
0,32,541
650 DATA105 22,32,228,255,201
,65 208 1116
660 DATA11,173,96,22,73,1,141
,96 613
670 DATA22,76,106,17,201 66,2
08,11,787
680 DATA173,65,22,73 1 141,95
,22 622
690 DATA76,106,17 201,67,208,
11,173,855
700 DATA94,22,73,1,141,94,22
76,523
710 DATA106,17,201,65,208,204
,56,147,1047
720 DATA13,13,13,32,32 32,
32,155
730 DATA32,32 32,32,32,40 65,
41,306
740 DATA32 00 82,73,70,84,69,
82,580
750 DATA32 32 32,0,13,13 32 3
2,186
760 DATA32,32,32,32,32,32 32,
32 256
770 DATA40,66,41,32 65,83,67,
73 467
780 DATA73,32 32,32 32,32,0,1
3 245
790 DATA13,32,32,32 32,32,32,
32 237
800 DATA32 32 32,40,67,41,32,
65,341
810 DATA69 68,32,87,79 82,68
32,516
820 DATA32,0 13,13 32,32,32,3
2 186
830 DATA32,32,32,32,32,32,40,
68 308
840 DATA41,32,65 68,73 84 13,
13 413
850 DATA13,13,13,32,32,32,32,
32 195
860 DATA32,32,32,32,83,69,
76,386
870 DATA65,67,84,32,75,80 84,
73 568
880 DATA79,78,0,134,5,132,6,1
88,594
890 DATA0 177,5,208,8,162 114
160 834
900 DATA18,32,105,22,96,162,1
10,1[illegible]
910 DATA18,32,105,22,96,79,78
,32 452
920 DATA0 79,78 70,0,162,228,
160,755
930 DATA18,32,105 22,32,84,19
,160 462
940 DATA0,185 224,18,157,51,3
200 838
950 DATA232,192 4,208 244,138
,162,51 1231
960 DATA160,3 32,189,255,169,
0,170,986
970 DATA168,32,186,255,32,192
255 32,1152
980 DATA183,255,201,0,208,207
,162 8,1224
990 DATA32 201,255 169,146,13
3,3 169 1108
1000 DATA22,133,4 169 0,120,1
41,63,843
1010 DATA255,177,3,141,62,255
88 32,1013
1020 DATA210,255,230,3,208,2,
230,4,1142
1030 DATA165,4,205,158,22,208
,230,165,1158
1040 DATA3,205,158,22,208,223
169 8,1036
1050 DATA32,135 255 32,204,25
5 96 44,1113
1060 DATA83,44,87,147,83,65,0
6,69,664
1070 DATA32,68,73,82,65,67,84
,75,554
1080 DATA82,85,13,13,0 169,1,
141 508
1090 DATA57,22 162,10,160,13,
32 105,615
1100 DATA22,32,101,15,224,0,2
40,237 875
1110 DATA32,161 20,165 0,141,
57 22 642
1120 DATA56,147,87,79 02,60,3
2 63 654
1130 DATA0,238,100 22 172,100
22,177,831
1140 DATA3,160,0 145,3,230,3,
208,752
1150 DATA2,230,4,165,4,205,15
5,22,831
1160 DATA208,234,165 3,205,15
6,22,208 1243
1170 DATA227,174,55,22 232,23
2,224 54,1264
1180 DATA240,22,169,146 22,56
,237,100 1012
1190 DATA22,157,146,22,232,10
5,146 22 936
1200 DATA233,0,157 146,22,76,
62,15,715
1210 DATA141 62 255 88,96,162
121,160 1085
1220 DATA19,32,105,22,162,0,3
2,207 575
1230 DATA255,157,51,3,232,201
13,208 1120
1240 DATA245,202,169,13 32 21
0,255 56,1222
1250 DATA70 73,76,68,78,65,77
,65 577
```

```
1260 DATA32,63,0,162,132,160,
15,32 680
1270 DATA105 22,32,210,15,162
,0,32,590
1280 DATA158,255,169,146,133,
3 169 22 1035
1290 DATA133,4,160,0 32,130,2
0 192 671
1300 DATA0 206,19,120,141 63,
255 145 351
1310 DATA3,141,62,255,88,230_
3,208 550
1320 DATA2,230,4,76,157,15,16
0,0,665
1330 DATA32,185,255,32,204,25
5,56 147 1216
1340 DATA76,79,65 68,32,68,73
,82 543
1350 DATA89,67 84,79 82,89,13
,13 495
1360 DATA0,32 94,15,138,162,5
1 160 656
1370 DATA3,32,169,255,169,8,1
70 168 594
1380 DATA32,186,255,32,192,25
5,32 183 1167
1390 DATA255 201,0,208,228 96
,162,107 1257
1400 DATA160,20,32,105 22 32,
210 15 600
1410 DATA165 147 32,210 255 1
62 8 32,1015
1420 DATA198 255 173,95,22,20
0,15,162,1132
1430 DATA0 160,0,32,207,255,2
32 208 1054
1440 DATA1,208,192,1,208,245,
224 47 1118
1450 DATA208,241 162,0,32,225
,255 240 1363
1460 DATA64,32,130,20,192,0,2
08,57 703
1470 DATA32,140,20 201,65,144
,15,201,816
1480 DATA91,176,11,157,51,3,2
32 224 945
1490 DATA69 240,10,76,25 20 2
24 0 663
1500 DATA240,3,32,161,20,32 2
25 255 968
1510 DATA240,23 32 130,20,192
,0 208 845
1520 DATA16,32,140 20 201,65,
144,237 856
1530 DATA201,91,176,233,162 0
78 52 991
1540 DATA20 169 0,32,195 255,
32 224 915
1550 DATA255,96 147,82,69,65,
68 32 814
1560 DATA84 69,88 84,13 13,0,
170 521
1570 DATA180 255 32,186,255,3
2 192 255,1367
1580 DATA96 32 207 255 72,32,
183 255,1132
1590 DATA168,104 96,172,95 22
,208,8 873
1600 DATA201,32 176,3,24,105
64 56 701
1610 DATA201 192,144,251,56,2
33 128 56 1301
1620 DATA120,141,63,255,142,1
00 22 162,1005
1630 DATA0 189,51,3,56,233,65
10,607
1640 DATA141,99,22,170,189 14
6,22 133 922
1650 DATA3 141,101 22,232,189
146 22 856
1660 DATA133 4,141 102,22,160
0 177 739
1670 DATA3,240 82 141,90 22 2
05,100 851
1680 DATA22,208,16,208 177_3,
217 50 893
1690 DATA3,208,8,204,100,22,2
48 23,608
1700 DATA76,212 20,238,98 22,
173 98 937
1710 DATA22,24,101,3 133,3,16
5,4 455
1720 DATA105 0 133,4,76,158,2
0,173,709
1730 DATA57,22,240 3 76,26,19
,141,624
1740 DATA62,255,88,32,120,22,
162 28,777
1750 DATA160,21,32,105,22,88,
32,70 546
1760 DATA75 84,32 70 79,85,78
,68 575
1770 DATA13,13,0,32,0,141,62,
255,516
1780 DATA88,169,13 32,210,255
,32,210,1003
1790 DATA255,169,5,32,210 255
,32 128,1066
1800 DATA22,169,158,32,210,25
5,162,15 1023
1810 DATA160,21,32,105,22 173
,57 22 632
1820 DATA240,4 32 64 17,96,17
3,96,722
1830 DATA22,240,42,32,171 255
169,4 535
1840 DATA32,120 20 162,4,32,2
01 255 826
1850 DATA32 120 22,169 13,32,
210,255 861
1860 DATA169,4 32 195,255,32,
174 255 1116
1870 DATA32,204,255,162 8,32,
138 255,1146
1880 DATA169 8 32,180,255,173
,94 22,533
1890 DATA208,1 96,162 156,160
21,32,836
1900 DATA105,22,32,204,255,32
,225,255,1138
1910 DATA240,11 32,228,255,20
1,69,240,1296
1920 DATA37 201,78 208,240,16
2 0 32 966
1930 DATA198,255 96 65,68,68,
32,87,869
1940 DATA79,82 68,32,84,79,32
,76,532
1950 DATA73,83,84,32 60,85,47
,78,546
1960 DATA82 32,83 13 13 0,162
,8,353
1970 DATA32,158 255,169,0,56,
237,198,1145
1980 DATA22 141,103,22,169,25
3 237,199 1146
1990 DATA22 141,104,22,201 0,
208 30,728
2000 DATA173 103,22,201,65,17
6 23,162 985
2010 DATA224,160,21,32,105,22
,56 70,738
2020 DATA79,32,82,75,79,77 32
76,536
2030 DATA65,70,84,13,13,0,120
141,510
2040 DATA63 255,173,198,22,13
3,3 173,1020
2050 DATA199,22,133,4,238 100
,22 160 878
2060 DATA0,177,3,172,100 22,1
45,3,622
2070 DATA165 4,205,102,22,208
7 165 878
2080 DATA3,205,101,22,240,11,
185 3,750
2090 DATA208,2,198 4,198,3,70
0 685
2100 DATA22 160,0 206,100 22,
173,100,783
2110 DATA22,145 3,208,195 50,
3 145 753
2120 DATA3,204,100,22 208,245
,238,100,1120
2130 DATA22 174,55 22,232,232
,224 54,1059
2140 DATA240,22,189 146 22,24
,189,100,852
2150 DATA22 157,146 22,232,18
5,146,22,936
2160 DATA105,0 157,146,22,76,
62,22 590
2170 DATA141,62 255,80 96,0,0
,0,642
2180 DATA0,0 0 0,0,0 0 0 0
2190 DATA134,5 132,6,160 0,17
7 5 815
2200 DATA240,12 32 210,255,23
0,5,208,1152
2210 DATA2,230,6,76,111 22,96
,162 705
2220 DATA0 236,100,22,240,10,
189 51,648
2230 DATA3,232,32 210 255,76,
130,22,960
2240 DATA55,200,22,201,22 202
22,203 960
2250 DATA22,204,22,205,22,206
,22 207 918
2260 DATA22,208,22,209,22 210
,22,211,926
2270 DATA22,212,22,213,22,214
,22,215,942
2280 DATA22,216,22 217 22,218
,22 219 958
2290 DATA22,220,22,221,22,220
,22,223 974
2300 DATA22,224 22,225,22,226
,22,0 783
2310 DATA0,0,0,0 0 0 0 0 0
2320 DATA0 0 0,0,0 0 0,0 0
2330 DATA0,0,0 0,0 0 0 0,0
2340 DATA0,0,-1
```

USA Today

There are a lot of strange peripherals available for C64s in the States. Here's a cross section just to whet your appetite

By Lewis Tilley

Do you have that tired, run down feeling? Does the big guy kick sand into your face at the beach? Do you want to compete better? Plug a *Bodylink* into your Commodore's cartridge slot and hook into the latest in sports training. This peripheral consists of the programs plus a "standard EMG sensor and lead set head band and three electrodes" which you place against the part of the body you wish to monitor. The result reads out on your screen with the aid of the two software cartridges included.

Computerised Muscle Exerciser and Trainer or *COMET* is an electronic muscle builder which comes as an extra. A cardiac exercise and stress reduction package are also available. Prices run from $149.95 for the basic package up to $239.95 for the stress reduction gear. Mail orders to Bodylog Inc. (see Touchline for address).

There is an italisized sentence in the firm's advertisement which will be reading more often as the use of computers expand into the mass markets. 'Knowledge of computers or computer programming is NOT necessary to use *Bodylink*.' That for you fellow!

To continue your physical education course, don't forget the latest in footwear. Puma's *RS Computer Shoe* has a computer chip built into its heel. After each training run you connect up to your 64 for a readout of the run record. The time, distance and calories you used will be fed in for a comparison with your past data and future dreams. Only $199.95 for a pair.

Now let's see. We have the electrodes on your head, a computer chip on your feet, if you'll just stick your hand into this lightweight cotton glove its sensors will do everything a joy stick will do for you and more. It's called *Hand Command* and comes from ShareData and costs $40.

Gone Fishing

Maybe you aren't a 'jock', which is an Americanism for "athlete" coined from their supporters. Maybe you like to fish. Got just the thing for you. *The Computerised Fisherman's Fight Recorder* fits on to your pole to use its chip to remember how long and how hard you worked to catch that fish. Available from the US merchandiser Hammacher Schlemmer for $75.

But seriously Folks

Heavy, heavy, heavy is this very different printer interface, *Device One* from Progressive Peripherals and Software at a price of $119.95. The price is high but the features overwhelmed the reviewers of this new attachment. It contains 32K bytes, a 6803.8 bit micro processor and its own power source. 16K of that memory is used as a print buffer but it doubles in brass when it stores eight different fonts in that buffer as well. A utility disk comes with these fonts plus 22 varieties of the standard 8 × 8 font and an editor so that you can design your own. This graphics interface which links a Centronics printer to the serial bus of the Commodore deserves a thorough review of its abilities.

Device One is a challenger to *Super Graphix* by XETEC which has offered its high technology to Commodore users for some time now. You might check it out from XETEC Inc. at $99.95. Their disk includes 27 fonts to be used with the interface.

If your major printout problem is impatience, you can get three versions of *Serial Box* which stores in a 64K buffer while printing to a Commodore Compatible printer. The *Serial Box-Plus* is serial to parallel with 64K buffer and the *Box-Max* is to a parallel printer and gives a massive 256K buffer. All of these include a font design and utility program called *Font Factory*. They are *GOES* compatible. R.J. Brachman Associates Inc. sell these at $79.95, $149.95 and $219.95 respectively.

Kaltek Labs, down in Puerto Rico, have devised an inexpensive way to scan a photo or drawing without the use of a TV camera. You attach a scanning head to your printer or any typewriter and connect to the 64's user port. The *Scammadore* system takes over to produce an image with its software which can be manipulated. The resolution is no better than might be expected, but it can be adjusted in tonal levels, exposure and contrast. Price for the complete kit is $54.95 from Kaltek Labs.

The best is yet to come. Berkeley Software, which revolutionised the new 64C, is working on an Apple *LaserWriter* driver for GEOS. The *LaserWriter* is a $5000 printer which responds to a text language from Apple called *PostScript*. It prints typeset quality text. Here in the States, some shops are offering the services of print-printouts on their *LaserWriters* from your disk.

Touchline

Bodylog INC *34 Maple Ave Armonk NY 10504*
Sharedata *7122 Shady Oak Road Eden Prairie MN 55244*
H&H Enterprises *PO Box 2672 Corona CA 91718*
Progressive Peripherals *464 Kalamath Street Denver CO 80204*
XETEC INC *2804 Arnold Road Salina KS 67401*
R.J. Brachman Associates *PO Box 1077 Haverton PA 19083*
Kaltek Labs *Adjuntas PR 00601*
New Comics *PO Box 8042 Chicago Il 60680*

I.Q.

In this new regular feature we bring you the best of strategy and adventure games together with some useful hints on how to improve your play.

The Pawn

Originally written for the Atari ST *The Pawn* had rave reviews both for its graphics and for its complex parser

Rainbird is the up-market arm of British Telecom's software interests and as with *The Jewels of Darkness* this program is no cheap at £19 95 But considering that you get two disks plenty of supporting written matter and an A3 sized poster it is not bad value

Instructions to play the game come in two small booklets one Commodore specific and the other a general gameplay guide There is also a very well produced 55 page book containing the background story and several pages of encyphered hints for the difficult bits

The first option that is highly recommended is to make copies of two Pawn disks henceforward to use these copies and retain the originals safely stored away There is even a copy program included so that you need no additional utilities to achieve this

This story is a strange mixture of ancient and modern with old favourites such as dwarves a missing princess and all powerful magician and an ice castle with no doors What this land of Kerovnia also has are many oblique references to a more modernistic society that tends to replace the classic framework with a satirical identity which is both amusing and witty

The final aim of the game is not spelt out but with an unpopular king a general election in the offing some murky trading in the drinks market and groups of banished dwarves in the wings not to mention Kronos the Magician – anything is possible

In common with those superb adventures from Infocom this program makes a great deal of use of the disk drive This regular disk access at most keyboard entries does mean that each move takes time to reach some form of conclusion especially when large pictures are to be created

The graphics are excellent but the full picture only allows three lines of text beneath it – so even more time is lost as you try to assimilate a number of lines of text three at a time

The instructions acknowledge this problem and recommend using another graphics mode, with only occasional peeks at the large pictures! One thing is certain *The Pawn* offers a great variety of viewing and editing controls that should satisfy the most demanding player

It is possible to get into quite a muddle with all the picture controls whereby you are looking at a picture that is not that of your present location GRAPHICS NORMAL

puts [illegible] their first variation of graphics [illegible]

The Pawn gives you a number of editing controls a most useful one being the facility for calling back your last command for re-editing Communicating with the game is fairly easy as the parser recognises many different ways of saying the same thing Leaving the Guru's hut may be accomplished by any of the following LEAVE HUT GO EAST E GO E OUT O EXIT EXIT HUT or EXIT EAST

These are very simple commands but an example given in the instructions shows that the parser will also accept such a tortuous command as GET ALL EXCEPT THE CASES BUT NOT THE VIOLIN CASE THEN KILL THE MAN EATING SHREW WITH THE CONTENTS OF THE VIOLIN CASE! The parser will also understand when an object already specified is to be used again GET SHIRT THEN TIE IT TO RAKE

Although this all sounds wonderful and indeed makes life that much easier in most cases, do not assume that the command interpreter is all powerful You must still retain the true adventurer's cynical attitude and double check your surroundings

An example of this may be found when you first arrive in Kerovnia You are wearing jeans and a T-shirt and have a mysterious silver band sealed around your wrist Obviously you immediately run an inventory check this tells you nothing more You know the program is renowned for its

parser so try FEEL IN POCKETS – great the answer is 'The pocket is soft'. However it takes three more commands to ascertain what is in there.

If you get stuck there are a number of hints given to help you. These are in the form of a series of two character blocks AN Y5 N6 DO GO 5B. Type in HINT and you will then be asked to type in this code. There are usually three sets of code for each potential question, the first often gets a flippant response the third is usually quite useful.

There will be several times where you have to talk to characters you meet along the way. The parser again offers you a choice of how to go about this. There is a useful command EXITS that will list all possible directions of movement from your present location. AGAIN repeats the previous command and SCORE gives you your current score and the maximum possible score.

With all these facilities to be shown off, what is the adventure itself like? There are lots of laughs, plenty of tongue in cheek satire and a reasonable difficulty level. Draw maps carefully as movement from one location to another is not always quite as you would expect it to be. SAVE your game position regularly (you'll need a previously formatted blank disk).

Altogether an interesting experience with a true adventure dressed up in the most modern mixture of programming technique and off beat humour. We will have to wait and see if these higher priced super products can stand the competition from cheaper and less elegantly programmed adventures. For Magnetic Scrolls *The Pawn's* programmers I hope so – I'm looking forward to seeing their next offering.

P F

Questron

Those of you who enjoy the *Ultima* series of adventures may well find that US Gold have come up with another winner in the same mould. *Questron* is a fantasy adventure game written by Strategic Simulations Inc in the USA. It is disk only but this is two sided – so there is plenty of program there to be explored.

The land of Questron has had a distinctly turbulent past. Everything fell apart at the seams some hundreds of years ago when one of the King's two chief wizards finally took the left hand path and became completely evil.

From that moment on a greater and greater number of vile monsters invaded the countryside. The population began to seek shelter in underground towns as these were the only places they could be sure of defending. Many were the knights that went out in the hope of defeating the evil Mantor but none returned.

The countryside and towns are shown in plan view and dungeons in 3D. The symbols representing plains jungle mountains and swamps also look familiar.

This plan view takes up about two thirds of the display with a number of action options to its left together with a brief status of the character's vital statistics. Reports of what is happening and your input commands appear on the four lines at the bottom of the screen.

Control may be entirely from the keyboard or a mixture of joystick and keyboard. All keyboard action commands are single key presses so the action is quick and simple to master. Whilst roving around you have such commands as Arm (choice of weapon) Dismount Fight Hold Item (for use by Operate) Speak Wear Rob Unlock Take and Examine.

As you move your character the screen scrolls past disclosing further areas of the country. There are a number of towns to visit and in each you will find shops that sell different means of transport ranging from horses and llamas to rafts clippers and eagles.

The towns also have two other places of great importance, Jails and Casinos. Bribe the warder and he will let you talk to one of the prisoners.

The Casinos offer three types of gambling 'double or nothing' blackjack and 'roulette'. A cool head and careful strategy can make you a rich man fairly quickly. Gold is an important part of the game and the two main sources are by killing monsters and by gambling.

Food has to be bought at regular intervals and as you progress you may also find a use for superior weapons and equipment. Be wary in the Casinos of winning too much, too soon. Win over 2000 gold pieces the gambling is closed and the town guards will attack you. They are fairly tough and if you have not yet built up your hit points you may come to an early end.

There are several Cathedrals to visit. These contain renegade magicians from the past and they are able to help you in several ways.

You start out with 15 points of your five main attributes strength stamina, dexterity intelligence and charisma. These attributes may be modified as play proceeds and you become wiser to the ways of Questron.

There is one other main site for you to find on the mainland and that is the King's Castle. Here you will find the wizard Mestron almost equal in power to the evil Mantor. Talk to him and he may well help you on your way.

Eventually you will want to talk to others in the castle but as they are behind locked doors, this is no easy task. First you will have to steal the right keys and this will bring any nearby guards hotfoot for the kill. You will have to have found a means of replacing your certain loss of hit points.

Once you have reached a high enough position in the land, you will be requested to seek out and destroy Mantor in his land of evil across the seas. Now you will have to find a way through those areas of thick choking fog that have so far evaded your exploration.

This evil land far to the west, has even today, got a few trading posts. Here you can buy various magical items and

several weapons that may be useful against the many new varieties of monsters found above and below ground The Dungeons are rife with traps and all manner of nasty things fortunately there are a fair number of treasure chests and magical caskets You may even be lucky and find a compass

For all those physical types that delight in roaming off into the great blue yonder, polish your boots and oil that sword Questron needs a hero Just remember grab as much gold as you can never talk to the guards and leave pinching the King's gold until you are sure of yourself **P.F**

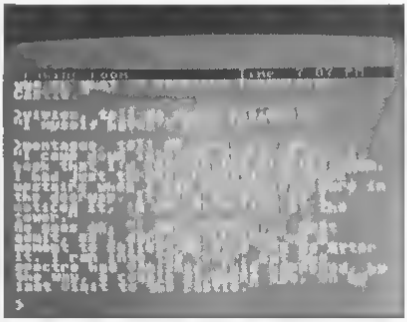
Moonmist

You receive a letter from one of your old friends Tamara Lynd in which she can't wait to tell you her news She has become engaged to an English Lord no less and is going to live in Tresylian Castle out in Cornwall – a lovely old place and reputedly haunted

How things change? Eight days later a second letter arrives and the tone of happiness has been replaced by one of sheer terror Tamara is convinced that someone is trying to kill her There have been two attempts on her life so far Also, several of the guests at the castle have reported seeing the White Lady especially after the unfortunate drowning of one of Lord Jack Tresylian s former girlfriends As you have a reputation as something of an amateur sleuth she begs you to come over and see if you can clear things up

So the story is set for *Moonmist* the latest detective story from those masters of the adventure game *2* Infocom (distributed in the UK by Activision) The game is set at introductory level and is ideal for those of you who don't quite fancy yourselves as Sherlock Holmes just yet At the beginning you are prompted for your name and title, thus determining your sex All the responses within the game are then adapted around your answer You are also prompted for your favourite colour for there are no less than four different variations within the game so that it is not something that you just play once and forget about

The game starts with you driving up outside the castle gates You quickly meet some of the other guests before going to your room to dress for diner No sooner have you taken a couple of bites than the plot thickens when a secret tape recorder plays a message from Lord Jack s late eccentric uncle in which he states that there is treasure



hidden somewhere within the castle and grounds

Treasure a ghost with some very odd behavioural habits the death threats to Tamara and the mystery of Deirdre s drowning when no body was ever discovered should keep even the most brilliant detective quiet for a bit You will have to go round the castle searching for clues and secret passages and asking the guests what they know about various people or objects

For once the atmosphere created within the game is not up to the usual Infocom standards The main reason for this is that the Americans have no idea how the British upper classes behave save what they have seen at the pictures A Coldstream Guards officer sounds more like Eliza Doolittle s father in My Fair Lady whilst the butler does a very good impression of Bertie Wooster rather than Jeeves These idiosynchrasies aside, the rest of the game is well up to standard with reams of excellent text descriptions and (thank goodness) no graphics

Infocom is also famous for the way in which the games are packaged and *Moonmist* is no exception A book on the ghosts of Cornwall a tourist brochure to the castle Tamara's two letters and an iron-on transfer for a tee-shirt are all included If you have always fancied yourself solving a major crime or four in this case, you could do a lot worse than discover why *Moonmist* has helped to make Infocom the best adventure writers in the business by a long way **G.R.H**

Silicon Dreams

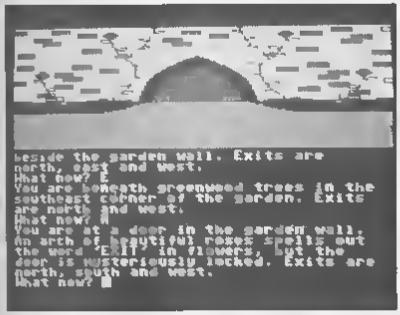
For some reason or other, most adventure plots have been more concerned with orcs and wizards rather than spaceships and lasers For the discerning sci-fi buff there has been a distinct lack of decent games Now their wait is over for Rainbird has put together three of Level 9's old games into one large compedium

Silicon Dreams is the title and the games included are *Snowball Return to Eden* and *The Worm in Paradise* The games have been re-written and expanded to make use of Level 9 s latest parser and compression techniques In the case of *Snowball*, graphics have been included for the first time

You play the part of Kim Kimberley secret agent extraordinaire In *Snowball*, you are charged with protecting an interstellar from your hibernation you are aware that something is dreadfully wrong but have no idea what Sinister nightingales lurk and pursue you as attempt to make your way to the control room and stop Snowball 9 from crashing into the planet Eden The fate of a mere two million people lies in your hands

Although you managed to save the ship, it was sabotaged and several powerful people have put two and two together and made five when they found you guilty of sabotage Sentenced to death you managed to escape and became the first of your race to land on Eden You must reach the robot city of Enoch and stop them from destroying Snowball 9 As if that wasn't enough the crew of Snowball are still after your blood

In *Worm in Paradise*, the setting is the city of Enoch 100 years later The organisation of the city is somewhat strange being based on zero taxes instant fines for crime and a booming business in spare parts for transplant surgery – you are immortal if you can keep replacing the necessary bits



You start off trying to make money but there is something delimitely wrong Can you, a mere citizen manage to save the world?

The games allow complex sentences to be input and the parser supports such features as 'get all' and the use of 'it' as in 'get box and open it' You can save the game to tape or disk as well as more temporarily to RAM Another useful command is 'OOPS' which allows you to correct those irritating little mistakes that just happened to kill you by stepping back a move The games come complete with full instructions and a 42 page novella entitled 'Eden Song'

Even if you already own one of the adventures, you should still seriously consider this package in its updated form If you haven't got any of the games then *Silicon Dreams* has got to be one of the bargains of the year at £14 95 **G R H**

Battalion Commander

If you've ever fancied yourself as a tank commander here's your chance to prove that you really are a latter day Rummel Not only do you get to control a tank but a whole armoured battalion

The setting for this latest wargame from the US Gold/SSI stable is a land battle at some stage in the near future You can choose to play American, Russian and unusually, Chinese forces over a set of variations that is absolutely mind-blowing If the problems of controlling an entire battalion was not hard enough in the first place, the whole game takes place in real time so there is no sitting back slurping a cup of coffee and pondering over your next move

There are five basic scenarios Novice is just there to let you get used to the controls Pursuit and exploitation is an incisive thrust into enemy territory Meeting engagement is a chance encounter Attack sees you trying to break through the enemy lines as you try to reach a key objective and defence is the exact opposite You can choose which side you want to be which of 40 different terrains you wish to fight over and whether or not you want to alter the relative strengths of the two sides

Control of your units is very straightforward One letter to designate the unit and a second to issue the order There is also a moving cursor to designate the area you wish to shoot at or move to etc You can command include moving firing normally providing suppressive fire or creating a smoke screen Enemy units only appear on the map when they have actually been discovered

Apart from your tanks, you may also find yourself in control of supply trains, anti-tank units, scouts heavy mortars and engineers

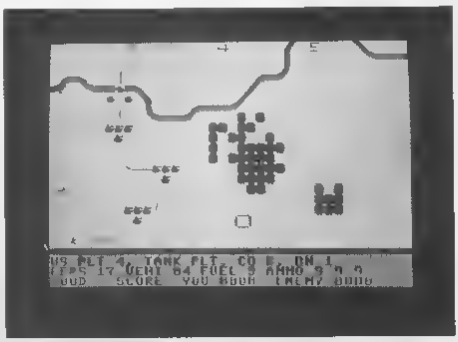
The game looks deceptively easy Starting at novice level, nothing happened for a few moves until I found the enemy and destroyed it without taking any damages As soon as I started playing for real everything was on a much grander scale and I got wiped out without any apparent effort on behalf of the enemy, most of whom I never even saw Coming complete with an excellent 20 page instruction booklet Battalion Commander is one of the best wargames yet produced for the C64 **G R H**

Touchline

US Gold *Units 2/3 Holford Way Holford Birmingham B6 7AX* ***Tel*** *021 356 3388*

Rainbird *First Floor 74 New Oxford Street London WC1A 1PS* ***Tel*** *01 240 8838*

Activision *23 Pond Street Hampstead London NW3 2PN* ***Tel*** *01 431 1101* **YC**



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- ☐ Fully ... Rom ... Rom ... Rom

Hack Pack 128

An excellent extension package for the C128

By Stuart Cooke

When the C128 was launched its improved version of Commodore Basic was widely acclaimed It was now possible to produce sound and graphics with far greater ease than with the outdated Basic of the C128's little brother the C64

A plethora of Basic extensions are available for the C64 to make it easier to use, even *Your Commodore* has published some in the past However, with the new powerful Basic of the C128 you would think that it would be unnecessary for anyone to produce an extension package for the C128 Systems Software obviously think differently as they have produced an excellent extension for the C128 called *Hack Pack*

Hack Pack can be split into three distinct sections and it is up to you which ones you actually LOAD and use Available for use are a Basic/programming toolkit a RAM-Disk and a program compressor

The RAM-Disk

This is probably the strong point of the package and a must for anyone who requires instant access to small programs

The C128 has, as its name suggests a large amount of memory In most applications not all of this memory is required by the user and is wasted The RAM-Disk option of *Hack-Pack* allows you to set up this area of memory as a disk-drive of course it has no moving parts but it is possible to SAVE programs in this area, you can get directions of files that are stored in there and most of the normal disk commands work

If you are using Basic the RAM-Disk is allocated two blocks of memory at the top of banks zero and one This does mean that the amount of memory that is used for Basic is reduced but this doesn't affect your programs that much since you would be very unlikely to have a Basic program that takes up all of the available memory

Should the RAM-Disk clash with your own programs then commands do exist that allow you to locate it wherever you want in memory I wouldn't expect a novice programmer to understand how to go about this but should you feel competent the manual is very clear and you should have no problems

FIGURE 1

As you are no doubt aware the Commodore disk drive is set up as device number eight To avoid a clash with this the RAM disk is accessed as device number nine again this can be changed by the user

So what is the advantage of using a RAM-DISK? Firstly there is the advantage of speed A program can be SAVEd and LOADed into and from a RAM-Disk almost instantly This has the advantage that if there are a number of programs that you are going to require a lot you can swap the one that you are using very easily

The COPY command has been extended to allow you to copy between the RAM disk and a normal disk drive It is possible to COPY single files between both the normal and RAM disk however the most useful feature is the ability to make copies of all the files on the RAM disk on a normal disk with one simple command

Toolkit

As I have already stated it is difficult to think what commands are missing from the C128's Basic System Software has however managed to select some extremely powerful and useful commands for this extension

Should you want to make changes

within a Basic program then it is actually quite difficult to find the area of the program that you wish to make changes in Wordprocessors get around this with a SEARCH and REPLACE command which allows you to search through a document for the occurence of any word and turn it into another one *Hack Pack* has a FIND command which will allow you to search through a file for a specific word There is even an option that allows you to specify which section of the program is actually searched

An extension of the FIND command CHANGE allows you to search a program for a specific word and change it into another

DUMP will print a list of all variables functions and arrays that have been set up to be printed out This is extremely handy when debugging a program since it allows you to see at a glance the state of all variables

INFO will give you some interesting data about the status of the computer Printed out after an INFO command are

Number of bytes occupied by Basic
The number of bytes occupied by variables
Number of bytes occupied by arrays
Number of bytes occupied by strings
The number of bytes available for Basic text
The number of bytes available for variables arrays and strings

MERGE will allow you to MERGE two files together in memory This is extremely useful if you have a number of subroutines stored on disk since you can add them to your latest masterpiece with this command

TYPE will take an ASCII file from disk and print it on the screen SIZE will display the size of the specified file in bytes and can be used with any type of file and the QUIT command will deactivate the toolkit

Compressor

When you are writing a program in Basic it is useful to space the program out as much as possible with a small number of statements on each line To make it even clearer you may even REM the program to make debugging easier A more efficient and memory saving method of program writing is to place numerous statements on one line What a compressor does is take a specified file remove all unnecessary spaces and all REM statements then it reduces the number of lines in the program by placing as many statements on each line as possible

Figure 1 shows a program before it has been passed through the compressor and after it has been compressed

Hack Pack is an extremely useful addition to the collection of a serious C128 owner Even in the short time that I have had it for review I have found it indispensible and use it regularly the RAM Disk being exceptionally useful

Touchline

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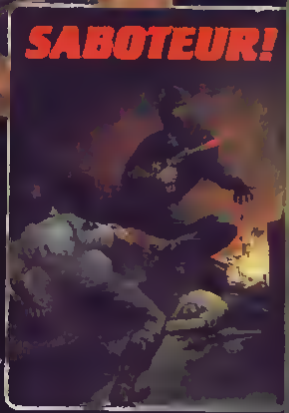

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GAME OF THE MONTH

Gauntlet

The most popular arcade game in the last 12 months has been brought to the small screen Enter a world of heroes, magic and lurking danger

By Marie Curry

Gauntlet is a two player arcade game which is totally addictive as many of you will know from the hours you've spent shoving your hard earned pennies into arcade machines

Now it's been released for the C64 by US Gold and is set to be a number one

It's a one or two player game but take my advice and stick to the two player option There are two reasons for this, the first is that you'll get much further with it and the second is that it's a great deal more fun You can decide to help or hinder each other (you play simultaneously) but watch out for treachery if you're supposed to be co-operating If you're both low on health point then there could a mad dash for the nearest succulent turkey to pep you up and the loser may dwindle away to a pile of bones!

When you start you are given a choice of four characters You can choose to be either Thor the Warrior Thyra the Valkyrie Merlin the Wizard or Questor the Elf Each has different attributes and strong weak points For instance Thor's got great armour and is very good at hand to hand combat, however he's pretty poor on the magic front Merlin, on the other hand has no magic can't fight very well with his bare hands but good at zapping people

Once you've decided which persona you want then you can go straight into the game Monsters abound Ghost Grunts, Demons Lobbers Sorcerers and Death Each have different ways of draining your energy and they all come in droves except Death although numbers of these increase on the higher levels

When you first play the game you may be quite daunted by the numbers of villains which you are expected to destroy order to work your way around the mazes The best way [illegible] around this problem is to head for the generators These [illegible] little square blocks which look different depending on [illegible] kind of monster they are churning out Shoot these [illegible] number of monsters can be controlled Get rid of all [illegible] and you can safely walk around a section to explore [illegible] around the dungeons are objects to pick up in [illegible] chances of success Potions are very useful as [illegible] thing which can kill Death (which sounds [illegible] in terms but isn't in this context) Special [illegible] special abilities You can also grab [illegible] power, hot speed, shot power light [illegible] ich are pretty self explanatory [illegible] most important thing to collect is [illegible] fuce are joints of meat lying around [illegible] eful not shoot the eider, before [illegible] ed eider [illegible] k lightly different so watch out for it since it decreases your health points There are keys to open doors and loads of treasure to pick up An amulet will make you invisible for a while Traps are glowing patterns on the floor which remove some walls and transporters take you from one area of the maze to another Exits are labelled black squares which move you to another level It will not necessarily be the next one, you can skip around quite a lot which means that the game has little chance of getting boring as there are hundreds of levels There are also Treasure Rooms which you stumble on at random These are bonus screens with no villains but there is a time limit You must collect as much treasure as possible and find the exit The limit is only 10 seconds

[illegible] All the [illegible] are [illegible] ish have [illegible]

[illegible] You can [illegible] the very high [illegible] their [illegible] time and well [illegible]

Tomahawk
Title [illegible] *Supplier* [illegible] *Price* [illegible] *Machine* *C64 Price* [illegible]
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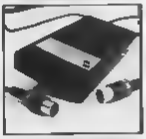

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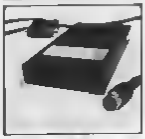

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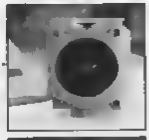

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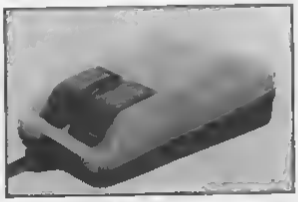

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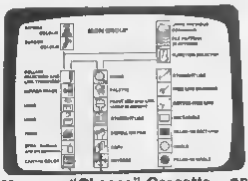

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Merlin Assembler

Assemblers aren't very common for the C16 and plus/4 However we've managed to have a look at this one from Wizard Software.

By Paul Eves

Merlin Assembler is a full 7501 two pass assembler for the Plus/4 and C16. It comes both on Tape and Disk. Wizard have gone for a green screen display once the assembler is activated. This is for eye comfort.

The program assumes that the user has a knowledge of 6502 machine code, so if you are not familiar I would suggest you acquire some before attempting to use this package. Because Merlin resides at $1000 to $21000 Basic has been moved to $2101. Once you have a source listing ready to assemble you just type ASM and press return.

Once loaded *Merlin* leaves the Basic intact. Therefore you may still use the already familiar editing features of Basic. Basic may also be integrated in the source listing. However all Basic lines must be after the END statement and are activated by GOTO and not RUN.

Program Designing

When designing a program using *Merlin* the first instruction must be the COM command. This command tells the assembler where to start assembling in memory from. If this command is missing then your program will not be assembled. e.g.

```
10 COM $5000
20 LDA # $1F
30 END
```

This would begin assembly from $5000 onwards. In other words the instruction lda # $1f would be the first instruction at $5000.

As COM is the first instruction of any assembly program, END must be the last. If END is missing the assembler will not know when to stop assembling. In this event should you have a Basic program after your source code the assembler will flag every unrecognised line as a syntax error.

The LIST command allows you to see what has just been stored into memory. If you do not wish to see everything you may insert a STOP command e.g.

```
10 COM $5000
20 LIST
30 LDA # $FF
40 STOP
50 LDY # $20
60 STA $D6
70 END
```

The above program would produce the following display on the screen after the copyright notice.

```
5000 AD FF LDA # $FF
READY
```

Note that lines 50, 60 and 70 have not been listed, this is because of the STOP command. If you wish to LIST the whole program then leave the STOP instruction out.

Labels

The use of labels in assembly language programming is essential. Notice I said Assembly Language programming and not Machine Language programming. Nobody in their right minds would attempt Machine Language programming these days unless they were from the old days of large complex machines.

Labels can be used anywhere within your source code but must be after the first COM command. All labels must be preceded by a full stop e.g. .LOOP and .GOT are valid labels but LOOP and GOT are not. The use of labels makes the task of the programmer that much more enjoyable. Consider the following small program:

```
10 COM $5000
20 LDA # $FF
30 ISR .DELAY
40 LDA # $01
50 LDX # $00
rest of program here
210 .DELAY DEX
220 BNE .DELAY
230 RTS
240 END
```

Instead of having to calculate forward or backward addresses you just put in your labels and the machine does the hard work for you. Labels also make for better program design in my opinion.

Two instructions that are pretty useful are *TX and *DA. These allow for the storage of data as either ASCII values or NUMBER values e.g.

```
*TX ' YOUR COMMODORE IS
TEXT
*TX 'SO IS THIS '
```

This would store the above two sentences in memory under their ASCII codes.

```
*DA $50 $FF 255 $601 F 32768
```

This would store the numerical values into memory. Note the mixture of both hex and decimal numbers. (As is standard the $ is put in front of any number that you wish to be taken as hex.)

Comments

Another important feature of assembly programming is to somehow put comments within the program. This is so that both the programmer and anyone reading the listing can see what's going on. This is far more important in assembly programming than in Basic programming. The way we achieve this with *Merlin* is by the use of remarks. A ; denotes a remark. A remark can be left in the source listing on a line by itself. Alternatively you can put a remark at least one space after the instruction with either way ; or without it e.g.

```
10 LDX # $00 ;Zeroise the X reg
20 Ready for indexing a list
30 LDY # $00 zeroise the Y reg
```

All the above are valid remarks.

On assembling any errors found are reported back to the user on screen. The format being LINE NUMBER THEN THE ERROR. For example

```
20 LGY # $00
```

would produce the error

LINE 20:SYNTAX ERROR

Obviously there is no instruction LGY.

Although this program is not as powerful as the Assembler I am used to (HS64 and PAL to name but two) I found it easy and quick in execution. Beginners to Assembly programming will find *Merlin* a very good aid to the development of their programs.

Extra

There are two extra points where I think this particular assembler scores over most others, that is the assembler has some intelligence of its own. To make this more understandable, look at the following short program.

```
10 LDX # $00
20 LDY # $DD00
30 LDA ($DC) X
40 LDA ($DC Y)
```

Line 10 is legal and valid. Line 20 is not valid, however the assembler would assume that you meant LDY $00, in other words it ignores the HI order byte and loads the accumulator with the LOW order byte. Lines 30 and 40 are both common errors that you will make. (Indirect index addressing always manages to confuse people). On encountering these types of errors the assembler would assume that you meant 30 LDA ($DC) Y and 40 LDA ($DC,X) respectively. This feature of the assembler is, in my opinion its greatest asset.

I have to be totally honest and say that as my knowledge of the Plus/4 and C16 is somewhat restricted I could not give this package the kind of indepth trial that I would prefer. However from what I have seen of it so far I have no hesitation in saying that it is a good buy.

Touchline
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MM 40

Games Reviews

As always there is a wide variety of games currently available We've picked out a selection for you to peruse

EREBUS

I know you're not going to believe this Earth is in danger again and you've got to save it!

Erebus is a distant planet used by man to reprocess dangerous waste Now some unpleasant aliens have reprogrammed it to produce a killer nerve gas to wipe out mankind Naturally you alone, are sent to obliterate these Hadeans and save the world

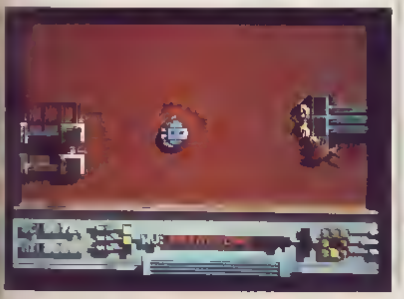
The refinery is split into circular levels that you must orbit zapping aliens as you go, until a dimension duct opens letting you through to the next level

Each level consists of raised barriers and objects designed for you to crash into while being chased by missile firing aliens

In between levels a bonus screen helps you to practice your shooting skills but it doesn't save the game from becoming yet another Uridium inspired shoot em-up T H

Touchline

Title Erebus ***Supplier*** *Virgin 2-4 Vernon Yard, Portobello Road London W11 2DX* ***Tel.*** *01 727 8070* ***Machine*** *C64* ***Price*** *£8 95*
Originality *4/10* ***Graphics*** *6/10* ***Playability*** *5/10* ***Value*** *6/10*



DESTROYER

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Each station has its own controls and impressive graphics ranging from the bridges bank of controls to the blip on the sonar screen

After a mission briefing you re on your own Typing in two letter commands moves you between stations where you can plot courses or set depth charge depths ready for a submarine attack

As the action hots up you will have to assign damage control crews, fight the enemy and keep the ship off dangerous reefs

The game plays very well and soon you'll be fighting your way through the difficulty levels earning your stripes as a Destroyer captain

Destroyer is very similar in play and style to Microprose's chart topper Silent Service only this time you keep your head above the water T H

Touchline

Title Destroyer *Supplier* US Gold (Epyx) Units 2/3 Holford Way Holford Birmingham B6 7AX *Price* £9 99 *Machine* C64
Originality 6/10 *Graphics* 9/10 *Playability* 8/10 *Value* 9/10

FLASH GORDON

Flash you've only got 24 hours to save the world! The evil Emperor Ming has targeted planet killer missiles at earth and you must stop him

Unfortunately the only way you can do this is to kill Ming before he fires them from the controls he always carries with him

The mission hasn't started well as your ship crashed into a jungle instead of blowing Ming's palace apart Now you have to search out Prince Barin and win his confidence (by beating him senseless) and ride to Ming's Palace on a bike he'll give you while fighting Ming's minions

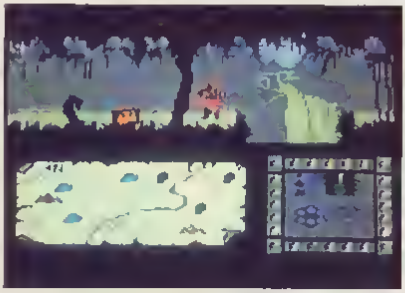
All this must be completed within 24 hours which isn't easy as you lose valuable time whenever a jungle monkey or snake chomps you or Prince Barin defeats you

Luckily this 24 hours doesn't include loading time as the game plays in three parts and you must complete them in order

Yet another excellent game in Mastertronics M A D series T H

Touchline

Title Flash Gordon *Supplier* Mastertronic 8-10 Paul Street London EC2A 4JH *Machine* C64 *Price* £2 99
Originality 8/10 *Graphics* 8/10 *Playability* 6/10 *Value* 9/10



INFODROID

Prepare for the ultimate in excitement A game based on motorbike messengers that pick up and deliver parcels! OK so the bikes are in fact custom built droids and it's set in the future but the action delivered by these futuristic Postman Pats is pathetic

The transport system used by the infodroids is extremely silly and consits of causeways split into four lanes travelling in each direction Easton lane consists of a series of platforms that travel faster the further it is from the central causeway Down the centre of the causeway are lift entrances to the companies that you deliver to and from garages to repair your droid and junctions to get to the 14 other causeways

The result is that the droids must hop around these speed platforms like demented froggers until they finally find their destination As for this game, it's going nowhere T.H

Touchline

Title Infodroids *Supplier* Beyond Wellington House Upper St Martin's Lane London WC2H 9DL *Tel* 01 379 7709
Machine C64 *Price* £8 95
Originality 6/10 *Graphics* 5/10 *Playability* 6/10 *Value* 5/10

TRIVIAL PURSUIT — YOUNG PLAYERS' EDITION

This is the first of Domark's additional question packs planned for its Trivial Pursuit game

This one's for the younger trivialists and contains two sets of questions for seven to 11 year olds and 12 years up

The gameplay is identical to the original Genus edition except the categories have now changed to Nature, Science/Technology Art/Culture Good Times Games/Hobbies and People and Places

While playing the game you can find out such fascinating facts as that silver is used to make film, who introduced That's Life that the Alm-Uncle is Heidi's grandfather and the colour of a cricket ball

This edition is available in two different versions either

as a complete game or as a 3000 question expansion pack for the original game

Obviously this one s for the youngsters and will be good training for the Genus edition but who wants to be beaten by an eight year old?

Other planned editions include the Genus II and Baby Boomer packs T H

Touchline

Title *Trivial Pursuit – Young Players Edition* ***Supplier*** *Domark 204 Worple Road London SW20 8PN* ***Machine*** *C64* ***Price*** *£14 95 (full game) £7 95 (question pack)*
Originality *1/10* ***Graphics*** *6/10* ***Playability*** *9/10* ***Value*** *8/10*

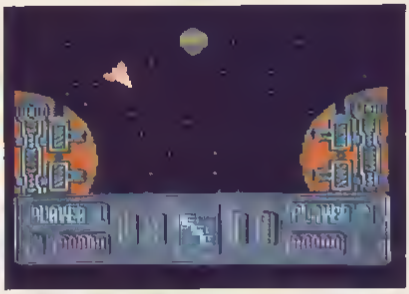
MEDIATOR

When the Americana label wass first launched, most people saw it as the label on which US Gold would dump all their games which failed the grade, thereby recouping some if not all of their losses Time however has shown that although there have been some poor releases on the whole the label has maintained a very high level of quality and with releases such as Go For Gold the label has become a firm favourite with Commodore 64 owners

All this said the latest release Mediator may well be remembered by some of you as it was released, admittedly more than a few months ago by English Software a company which in its time has had quite a few hits Why mediator was not a hit is a matter for conjecture but at £2 99 it really does deserve to make the grade

The game is set long ago when a doomsday machine was placed in high orbit above the satellites Xylos and Pholos with a sole role to deter further attacks of nuclear war between the empires of the galaxy If this satellite detects undue levels of nuclear activity, it will be activated and it will then destroy both civilisations

As the saviour of the galaxy, it is your task to locate the legendary Good Mediator to acquire the mythical time crystal which will then allow you to solve all the problems of your galaxy Graphically, Mediator shows its age in more ways than one The actual animation is very good but the

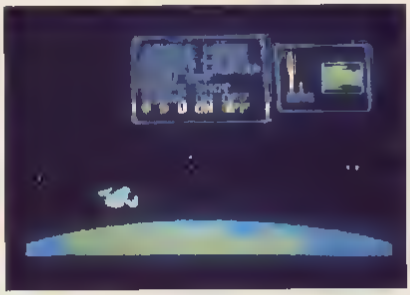


spite of the [illegible] problems and the backgrounds are less than perfect

The music too reflects the age of the game, especially the background music which is nothing short of nauseating The fact is that this game is not trying to be sold at full price therefore many criticisms must be ignored purely because the game represents such excellent value for money If you can stand the graphics and sound then the game is as good as many more recent full priced games, with more than enough problems to last the average arcade game fan happy for many an hour F J

Touchline

Title *Mediator* ***Supplier*** *US Gold Units 2/3 Holford Way Holford Birmingham B6 7AX* ***Tel.*** *021 356 3388* ***Price.*** *£2 99* ***Machine*** *C64*
Originality *6/10* ***Playability*** *6/10* ***Graphics*** *6/10* ***Value*** *6/10*



DEFCOM

By the year 2056 the Strategic Defence Initiative Star Wars system was in position and had been installed, worked and captured by aliens that turned it into a weapon

against the now peaceful Earth

Luckily you as Nick "Daring" Diamond can still fly the only surviving anti-aircraft weapon and warp off to save the world

Unfortunately you only have a single firing laser and must blast away at the attacking aliens and the killer satellites over the planet rotating below

The action is fast but also non descript as you'll soon tire of this and look to the extra options such as a twin firing laser and displaying your score on the screen! However these are selected from a menu while the game continues so you won't live long enough to appreciate them

Yet another game where a good idea has been let down by a poor game T H

Touchline

Title *Defcom* ***Supplier*** *Quicksilva Victory House Leicester Place London WC2H 7NB* ***Tel.*** *01 439 0666* ***Machine*** *C64* ***Price*** *£8.95*
Originality *6/10* ***Graphics*** *5/10* ***Playability*** *4/10* ***Value*** *4/10*

TARZAN

From the western coast of the Congo, to the palm fringed shores of Zanzibar African folklore tells of the legendary exploits of one man that man was Tarzan Lord of the Apes Left as an orphan in the jungle, Tarzan was nursed by a she-ape Kala and Tarzan learnt the laws and language of the jungle

Only later in life was it discovered that Tarzan was really none other than John Clayton Lord Greystoke Whether or not he was a Peer of the Realm, Tarzan was still himself at heart and whenever necessary he would don his leather loincloth and swing Weissmuller style through the trees

Even as we speak however, needs drove Tarzan to shrug off the thin veneer of civilisation and brave the perils of the jungle once again Lady Jane Greystoke (her of "me Tarzan you Jane" fame) has been abducted by Usanga chief of the Wamabo and she will meet a terrible and agonising death, unless Tarzan retrieves the seven gemstones which have been stolen from the tribal shrine

This is the setting for Martech's latest romp and it could be the beginning of the end for anyone who loves addictive arcade adventures with a necessarily for mapping In three computer days you must control Tarzan until you have finally collected all seven gems, and only then will you have any chance of saving Jane

To help Tarzan there are various animate and inanimate objects that must be collected including ropes monkeys and different coloured shields Without these items Tarzan will never complete his mission so a keen eye is essential

The first thing anyone will notice upon loading the game is Rob Hubbard's incredible soundtrack which, technically must be his most impressive to date With only 4k free Rob has managed to get the whole Tarzan theme complete with incredibly authentic bongos as well as a host of effects including a nightime section complete with chirping crickets!

Once loaded the quality of the graphics is also apparent Nice backgrounds and an excellently animated Tarzan all add to the feeling of the game, although the time taken to flick-scroll the screen, and the manner in which it is done is less than impressive

Tarzan is an excellent arcade adventure which together with games such as Antiriad show the way for software companies to go Even if the game was boring the Rob Hubbard music would justify the price however it isn't so how can you lose? F I

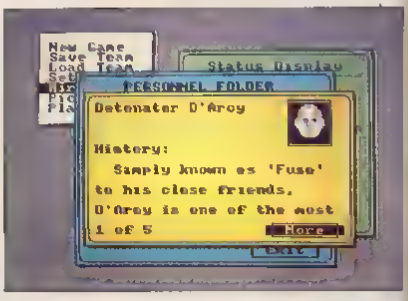
Touchline

Title *Tarzan* ***Supplier*** *Martech Martech House Bay Terrace Pevensey Bay E Sussex BN246EE* ***Tel*** *0323 76616* ***Machine*** *C64* ***Price*** *£9.95*
Originality *8/10* ***Graphics*** *7/10* ***Playability*** *7/10* ***Value*** *8/10*

THEY STOLE A MILLION

Ever wanted to plan the perfect crime from the comfort of your living room? Now you can using the S W A G (SoftWare for Aspiring Criminals) disk available through "What Crime" magazine

This database of hoodlums for hire targets to be robbed



and fences to sell the goods allows you to plan and execute enough jobs for you to rise from small time crook to Mr Big.

Using window menus you can buy information and blueprints of your chosen target and select your team to do the job. Characters such as Charlie Volt and Detonator D'Arcy have specialist skills that can be hired for a fee and usually a cut of the profits so you should shop around to find the right team.

Using the blueprint and a simple set of icons you can plan every step of the raid from disabling alarms to blowing the safe.

During the raid the Boss usually is the lookout (or sitter) and must freeze the action if a police patrol comes into view.

Success will lead you on to bigger and better jobs until you tackle a top security bank as you go for the million.

T.H.

Touchline

Title *They Stole a Million* ***Supplier*** *Ariolasoft 68 Long Acre London WC2E 9JH* ***Machine*** *C64* ***Price*** *£9.95*
Originality *8/10* ***Graphics*** *4/10* ***Playability*** *7/10* ***Value*** *7/10*

STARBURST

The C16 boom seems to have slowed down slightly, and with it the number of really good games. One of the few games that really made the best of the little Commodore's graphics and colour was an offering from Ariolasoft called Hyperforce and programmed by Tony Takoushi.

[illegible] when the latest Ariolasoft release was released I was eager to get my grubby little hands on to the joystick and put it through its paces. Hmmm, it first impressions count then this game failed to impress me. It seemed to me that the author had tried to cover up for the games obvious roots by overcomplicating the gameplay something that has seen many people fall flat on their faces.

Only after a few hours play did I start to find myself hooked although why I was hooked I'm not totally sure. Starburst is basically a breakout derivative with some new touches and added gameplay. In order to keep the game interesting for more than a few minutes there are three different levels all of which take some time to master.

The first level involves blasting at two balls at the top and bottom of the screen until they have been hit so many times that they become 'active'. Your ship then stops firing and turns into a large pong type bat, with which you must guide these two balls into their respective home slots. The moral of this screen is speed as the faster it is completed, the more points are built up. It this level sounds too easy there are some rogue balls to complicate it and if you fail to achieve the objective before the two active guages run out then you must start a completely new game (no lives on this level!).

If you successfully complete level one you are thrown into a bonus level and it is here that points come free and easy until time runs out. Level two involves blasting through a force field from either the bottom or the top of the screen. As the forcefield shrinks a number of coloured balls appear, and must be avoided at all costs and at one point it gets so bad that there are eight balls flying around at break-neck speeds! As with level one completion leads to a bonus level which lasts as long as the amount of gauge time you have remaining.

Level three ought to be the most difficult but it isn't! All you need to do is round up the Plastron Boulders by shooting them. Points are flying around here with 500 available every time you complete the game. Reminiscent in many ways of an early Minter game, Starburst at £2.99, represents excellent value for money and should not be missed by any C16/Plus 4 owner looking for a challenge.

F.J.

Touchline

Title *Starburst* ***Supplier*** *Ariolasoft 68 Long Acre Covent Garden London WC2E 9JH* ***Tel*** *01 836 3411* ***Machine*** *C16/Plus 4* ***Price*** *£2.99*
Originality *9/10* ***Graphics*** *6/10* ***Playability*** *7/10* ***Value*** *7/10*

CHAMPIONSHIP WRESTLING

Over the past couple of years, one company above all others has stood out when it comes to sport simulations. That company is Epyx. Once again they have proved their

worth with Championship Wrestling In general I am not a great sports fan However, where computers are concerned, I feel that sports programs offer a fine medium of entertainment

Basically the objective in Championship Wrestling, is to get rid of all opposition and become the Champion wrestler As in most Epyx games, the more people that partake in the festivities the better On loading up you are asked if you want to either practice, compete or see world records

Obviously, to start with you choose the practice option This allows you to get acquainted with all the various moves and joystick positions that are required (I would suggest you get plenty of practice before doing battle with someone else)

In the competition mode, if you are playing alone, you select a wrestler and then play each of the seven others in turn With more than one player, each player will be asked to choose a wrestler The computer then organises the matches and battle begins

When playing in competitions, judicious selection of who you want to be is crucial Each wrestler has his own style and strong points Also each has one specialised move that none of the others have So once again practice is recommended to discover each wrestlers effectiveness (This move is known as the custom move)

Overall, there are some 30 moves possible that each wrestler can perform Unfortunately, there is not enough space here to go into each one in detail Basically they are in eight groups close to opponent, far from opponent, custom move headlock, lift, airplane spin, opponent on mat and walking around ring The use of certain moves depends upon your previous move For example to give your opponent an airplane spin you need to be lifting him in the air To be able to lift him, you need to have him in a headlock To get him into a headlock you have to be close in It's this interaction of moves that makes the game that much more enjoyable

There are one or two nice touches within the program For instance if you take your time the crowd will boo and hiss and wave banners Throw your opponent out of the ring and the crowd go wild All in all, this is a nicely presented game that with practice is quite playable and fun

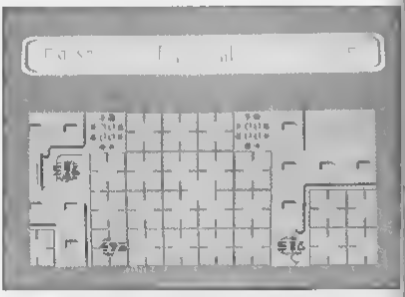
Touchline

Title *Championship Wrestling* ***Supplier*** *US Gold, Units 2/3 Holford Way Holford Birmingham B6 7AX* ***Price*** *£9 95* ***Originality*** *7/10* ***Graphics*** *7/10* ***Playability*** *8/10* ***Value*** *8/10*

PARADROID

For those of you that missed them first time round, Hewson has re-released two very popular '86 hits Paradroid and Uridium, both programmed by Andy Braybrook Paradroid is the same as before, except that it is much faster, whilst Uridium has lots of new ship designs So what do you have to do?

Paradroid is simple, you are ordered to destroy a mutinous crew of Droids that have taken over a galactic freighter To aid you in your task you are issued with a 'Droid Influence' device With this device you can take over and control Droids (You can also simply blast them out of their existence) The droids are scattered around the ship, which is made up of several decks Obviously, things are not that easy The droids are made up of varying power



strengths The higher the droid number the better it is Once you destroy all droids on one deck, the deck computer shuts down and therefore all lights go out In other words the deck goes dark One word of caution here Do not think that it is simply a matter of blasting everything in sight on each level There is a lot more strategy involved My only real tip for you is proceed slowly

Next question is, what weaponry have I? The influence device is fitted with low power twin lasers, The droids also have twin low power lasers However as the droid number becomes higher, then its firepower increases Two types of battle droids have disrupters, these you have to take over, you cannot shoot them Transferring to droid is quite involved, but most of the strategy is applied to this part of the game Decide which droid you wish to take over, stop and centre the joystick Press the fire button and hold it down then ram the chosen droid The screen will now change to what ressembles a circuit diagram The idea being to control the rectangular blocks by having your colour represented inside the block You gain control of a block by moving your pulsars up or down, then pressing the fire button at the required place If after the time limit you have more of the blocks coloured in your colour transfer is complete The higher the droid number, the more pulsars are made available to it

To move around the different decks, find one of the lifts and press the button whilst you are standing on it You may view decks, the whole ship, or droid capabilities by standing in front of one of the deck consoles that are scattered around.

I fairly enjoyed Paradroid the first time, but now that it has been made slightly faster in play, it becomes even more enjoyable

Touchline

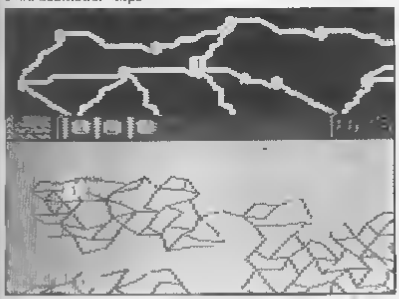
Title *Paradroid* ***Supplier*** *Hewson Hewson House, 56B Milton Trading Estate Milton Abingdon, Oxon OX14 4RX* ***Machine*** *C64* ***Price*** *£9 95 with Uridium*
Originality *8/10* ***Graphics*** *8/10* ***Playability*** *9/10* ***Value*** *9/10*

TRACKER

As Chandos, leader of an unscrupulous group of space pirates and mercenaries you have been given a tough assignment The centrepoint complex on the planet of Zeugma IV has gone beserk The computer that controls all facets of life on this plant of pleasure, has decided that it no longer needs human controllers No problem just switch it off? Wrong This computer has a few tricks up its sleeve — if computers have sleeves — to stop you pulling the plug

Not least of these are the Cycloid patrol craft over which it has total control These craft patrol the trackways that surround the computer complex destroying anything in their path this can be a problem if you are on the trackway at the time Therefore to aid you in your mission, you have been equipped with the best ships that Caliban can provide To reach the computer centre it is necessary for you along with a maximum of seven other ships to traverse the trackways knocking out communication centres and the cycloids

Your ships are equipped with ion bombs, and forward firing lasers to accomplish this task The bombs have very short fuses, so do not hang about too long The C P complex consists of 22 interconnecting sectors, each with its own communication centre You are initially beamed down to three Safe Sectors', and can on knocking out a centre, beam down additional ships



The game itself is displayed in three sections At the top of the screen is a scrolling map centred on the current ship being controlled Any enemy forces are also displayed on this screen Half way down the screen is the status window Shown here are the current conditions of all eight ships Also shield status and whether they are under attack or not On the left of this window, is a more informative display of your current ship in use Along with this there is an audience rating a sort of score which continuously counts down The better you do, the more points you clock up Beneath this is where most of the action takes place

This screen has two functions Firstly it displays one of four maps of varying scales These are selected via the function keys Alternatively, a 3D view through the cockpit can be called up This is where all combat takes place This screen is used when dropping bombs on Comms centres, and when destroying the computer itself

This game comes well packaged, with a short novelette, to get you into the right mood It is a good attempt at an original game The game itself is a very cunning and strategically orientated game, with undertones of the Star Wars trench sequences At £17 95 this may be a little pricey for some people, but if you can afford it, you could do a lot worse than purchase this program

Touchline

***Title** Tracker **Supplier** Rombird Software Wellington House Upper Street Martins Lane London WC2H 9DL **Price** £17 95 **Machine** C64*
***Originality** 8/10 **Graphics** 8/10 **Playability** 9/10 **Value** 7/10*

URIDIUM

The second of Hewson s re-releases is Uridium Fans of the game will only need to be told that this is the same as before but with some new superb ships For those of you that are new to this game let me expand

The solar system is under attack from metal seeking ships known as Super-dreadnoughts These ships seek out and drain precious metal ores from the planets within your sector Your task is to destroy the dreadnoughts before they exhaust all the different ores Firstly, you must destroy its defenses both on the surface of the ship, and those that fly around in attack groups Control is by the joystick and is as follows Up and down control your height above the ships surface Left and right control your direction Avoid structures on the ships surface that cast shadows, this means that they are high up The dreadnoughts fighter defences deploy in waves, so be prepared for some nifty flying

On the ship, the small coloured squares that flash are silos for the homing mines These can be fairly easily avoided if they appear singly Destroy as many of the surface defences as you can, whilst avoiding the fighters Keep flying right, and be on the look out for a landing strip Once the 'LAND NOW' signal is seen, land your craft as quickly as possible The surface fighters become very intelligent at this point

On safely landing, you are then presented with the bonus screen It is up to you to gain as many points as possible before flying over the dreadnought for the final strafe run I have to be honest, and say that normally, I am not into shoot and blast em type of games My forte being text only Infocom However, when Uridium first came out, I must confess I could not stop playing it There is something about this program that puts it in the same class as Boulderdash 1, 2 and 3 I am pleased to say that this re-release lives up to its predecessor The new dreadnought designs are done really well And quite a few of them will have you pulling your hair out The designs are in the same Bas relief as before, with one or two extra characters re-defined

Touchline

***Title** Uridium **Supplier** Hewson, Hewson House 56b Milton Trading Estate Milton Abingdon Oxon OX14 4RX **Machine** C64 **Price** £9 95 with Paradroid*
***Originality** 7/10 **Graphics** 8/10 **Playability:** 9/10 **Value** 9/10*

BANANA STOCKISTS

BUCKINGHAMSHIRE

[illegible]

CAMBRIDGESHIRE

[illegible]

CORNWALL

[illegible]

CUMBRIA

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Nine Line Matrix

This C128 utility will make your 80 column display a lot clearer and it's short and easy to use

By A. Millett

Quite a while back Commodore brought out the 4000 series Pets. Like their predecessors and the subsequent Commodore range they suffered from ROMs (called 'Basic 4.0') that were incompatible with all the other Commodores. This caused many programmers like myself the annecessary pain of wading through and modifying our programs, and many others the bigger pain of having to lash out large amounts for new Basic 4.0-compatible goodies (that, I believe was the point of the exercise).

That aside one nice little feature this machine possessed was a vertically-spaced mode with an extra raster line between each line of text on the screen. This routine will allow C128 users to do this in 80 column mode!

Operation

Operating the program is pretty self-explanator. Just load and run it, use cursor up and down to centralise the screen and hit RETURN. You can now continue to use the 80 column screen as normal with other column programs and the screen will remain in vertically spaced mode until the machine is switched off.

Note that I have used high line numbers so that you may incorporate the program into your own programs. To do so, change the END statement in line 39590 to RETURN and call the routine at the beginning of your own program with GOSUB 39000.

If you are interested with experimenting with the 80 column chip you will find the SYSs I have used very interesting. Even though the SYS REED command (yes, that's REED!) is unused in this particular program I have left the variable and some REMs in so that you may experiment with reading the 80 column registers.

I hope you find this routine as useful as I have. The tops of those ... don't touch the bottom of those ... any more!

```
PROGRAM: 9 LINE MATRIX

39000 REM" 9 BY 8 MATRIX FOR
80 COLUMNS ON THE C128
39020 REM'              BY [s A]D
RIAN [s M]ILLETT
39040 REM
39060
39070 BANK 15
39080 WRITE=52684 REM" [s U]S
E SYS WRITE,DATA,REG    TO SE
T 80 COLUMN CHIP REGIS
TER
39090 REED=52658 REM" [s U]S
E SYS REED,0 REG RREG DATA
TO READ REGISTER
39095              REM'  YES,
THAT WAS REED, NOT READ!
39100 SYS WRITE 8,9  REM' [s
R]ASTER LINES PER CHARACTER
39120 SYS WRITE,25,6 REM" [s
N]O. OF LINES DISPLAYED
39140 SYS WRITE,7,23 REM" [s
N]O  OF RASTER LINES IN CHAR
 DISPLAYED
39160 SYS WRITE,35,4:REM" [s
A]BSOLUTE NO  OF LINES
39180 SYS WRITE,30,7 REM" [s
V]ERTICAL POSITION OF TOP OF
SCREEN
39200
39210 SYS 27500,,0 SYS 27500,
,5 REM" [s E]QUIVALENT OF GRA
PHIC 0 GRAPHIC 5
39215        REM' [s S]PECIAL M
EMOD FOR BASIC-128 COMPILER
- USES 8K LESS MEMORY!
39220 PRINT CHR$(142),"[CLEAR
][s O]  ,SPC(77),"[s P]",
39240 CHAR 1,0,24, [s L]
39260 CHAR 1,78,24, [s R]  RE
M" [s S]HIFT-0  CHARACTER
39280 CHAR 1,22,9,""
39300 PRINT CHR$(14),"[s U]SE
 CURSOR UP/DOWN TO MOVE DISPL
AY,
39330 PRINT SPC(27),"[DOWN][D
OWN][s H]IT [s R]ETURN [s T]O
 U]SE RO[s N]O WHEN REA
DY "
39340 KUP=30
39350 SYS WRITE,KUP,7 REM" [s
 V]ERTICAL POSITION OF TOP OF
 SCREEN.
39360 DO GET KA$
39380 LOOP UNTIL INSTR("[DOWN
][UP]"+CHR$(13),KA$)
39400 IF KA$= "[UP]" THEN KUP=
KUP+1 GOTO 39350
39420 IF KA$="[DOWN]"  THEN KU
P=KUP-1 GOTO 39350
39500 PRINT "[CLEAR]"
39590 END REM" [s U]SE RETURN
 IF SUBROUTINE
39999
```

commodore

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Joystick Read

Here's a time saving and invaluable joystick routine for Basic programmers in league with a C64

By Nick Sumner

How many sleepless nights have you spent wishing that there was an easier way to read the Commodore's joystick ports through Basic One that was much faster and easier to understand Well, funnily enough, here is that routine! Read on to find out more

In Use

This Joystick utility has been designed to help those who are Basic programmers, but who want to add that professional touch to there programs Using this routine for a joystick in Port 2 could just do that!

The actual routine is on an interrupt and so doesn t waste Basic's time for GOSUBS etc

Two Basic string variables are used to store the joystick information, so no PEEKing is needed either!

However there are a few things that you will need to know before you can run the routine so read on!

Because the routine uses two string variables these need to be set up by the programmer) before any other variables are defined or the machine code routine is called This is what to do!

In your program

```
10 JO$=" " FIRE$= 'OFF' SYS
52736
```

JO$ and FIRE$ must be set like this either at the first line or in a subroutine BUT they must be in that order and before any other variables

Next, do not call the routine twice within your program or the computer may crash or BASIC may be corrupted!

For all m/c enthusiasts there is a disassembly included The interrupt routine shown can be used for smooth scrolling, more than eight sprites or other raster tricks

The test program included allows you to move a white block around the screen with the joystick and the fire button will make the border colour change (well it's only a demo!)

I hope you enjoy using this routine in your own programs

```
JOY TIMR ROUTINE DISASSEMBLY

  1 MCENDH   =  $CFFF
  2 COUNTL   =  $CFFE
 99 *=$CE00
$CE00        SEI            |  SET INTERRUPT DISA[illegible]
$CE10        LDA #$00       |  CLEAR CIA CONTROL REG[illegible]
$CE20        STA $DC0E
$CE30        LDA #$1B
$CE40        STA $D011      |  CLEAR MSB FOR FASTER
$CE41        LDA #$80
$CE42        STA $D012      |  SET RASTER POSITION
$CE50        LDA #<RT
$CE55        STA $0314      |  CHANGE JUMP LOCATION
$CE60        LDA #>RT
$CE70        STA $0315
$CE80        LDA #$01
$CE90        STA $D01A      |  SET E.R IRQ COMPARE
$CEA1        LDY #$00       |  FIND JO$ CO-ORDINATES
$CEB2        LDA ($2D),Y
$CEC4        STA $FB
$CEC5        INY
$CEC6        LDA ($2D),Y
$CED0        STA $FC
$CED2        LDY #$0A       |  FIND FIRE$ CO-ORDINATES
$CEE3        LDA ($2D),Y
$CEF4        STA $FD
$CEF5        INY
$CEF6        LDA ($2D),Y
$CEF7        STA $FE
$CEF8        LDA #$55       |  PLACE ASCII 'U' INTO MEMORY
$CEF9        STA $CF10
$CEFA        LDA #$44       |  PLACE ASCII 'D' INTO MEMORY
$CEFB        STA $CF11
$CEFC        LDA #$4C       |  PLACE ASCII 'L' INTO MEMORY
$CEFD        STA $CF12
```

```
1362          LDA #$52          PLACE ASCII 'R' INTO MEMORY
1364          STA $LF13
1480          CLI               CLEAR INTERRUPT DISABLE STATUS
1484          RTS               RETURN TO BASIC
1500 FT       LDA #$01          CHECK FOR INTERRUPT OCCURING
1505          BIT $D019
1510          BNE BEGIN
1512          JMP $EA31         JUMP TO SYSTEM ROUTINES
1515 BEGIN    LDA #$01          SET REGISTERS FOR WORK
1519          LDX #$00
1520          STA COUNT1
1521          LDX #$00
1523          LDA #$20
1524          STA ($FD),Y       CLEAR JOS
1525 LOOP1    LDA $DC00         READ JOYSTICK
1530          AND COUNT1        GET ONE DIRECTION
1535          BNE NEXT          IF NOT USED GO ON
1540          LDA $C1A0,X       GET ASCII VALUE
1545          STA ($FB),Y       STORE IN JOS
1550          JMP FIRE          GOTO FIRE BUTTON CHECK
1555 NEXT     ASL COUNT1        DOUBLE COUNT1
1570          INY
1575          CPY #$04          ALL DIRECTIONS CHECKED?
1580          BNE LOOP1
1581 FIRE     LDY #$09          SET FIRE$ TO OFF
1582          LDA #$07          (SET STRING LENGTH TO 3)
1583          STA ($FD),Y
1584          LDY #$01
1590          LDA #$46
1595          STA ($FD),Y
1599          INY
1591          STA ($FD),Y
1592          LDA $DC00         READ JOYSTICK
1593          AND #$10          GET FIRE BUTTON
1594          BNE STOP          IF NOT PRESSED THE GOTO STOP
1595          LDY #$09          CHANGE FIRE$ TO ON
1596          LDA #$02          (CHANGE LENGTH OF FIRE$ TO 2)
1597          STA ($FD),Y
1598          LDY #$01
1599          LDA #$4E
1600          STA ($FD),Y
1612 STOP     LDA #$FB          SET NEW PROTER POSITION
1613          STA $D012
1614          LDA #$1B
1615          STA $D011
1616          LDA #$01          RESET INTERRUPT FLAG
1617          STA $D019
1620          JMP $EA31         JMP TO SYSTEM ROUTINES
```

```
PROGRAM  JOYSTICK ROUTINE LOADER

10   10 REM ********************
04   15 REM *                  *
36   20 REM * JOYSTICK ROUTINE *
C6   25 REM *                  *
93   30 REM *  BY NICK SUMNER  *
50   35 REM *                  *
22   40 REM *     30/8/86      *
62   45 REM *                  *
95   50 REM ********************
76   100 POKE53281,0 PRINICHR$(147
     )CHR$(5) [SPC7]**** JOYSTICK
     ROUTINE ****"
83   110 PRINT:PRINI LOADING IN DA
     TA NOW    "
5C   250 MC=52736 RL=0 LN=500
28   260 SC=0 FORI=0TO7 READD
51   270 IFD<0GOTO340
0B   280 IFD>255GOTO330
C0   290 POKEMC+RL,D SC=SC+D RL=RL
     +1 NEXTI
FA   300 READD IFD<0THEN340
30   310 IFSC=DTHENLN=LN+10 GOTO25
     0
0A   320 PRINI PRINI"?SUMCHECK "
32   330 PRINI ERROR IN LINE" LN:E
     NO
[illegible]  340 READD:IFD<>DGOTO320
```

```
[illegible]  350 PRINI PRINI "DONE"
[illegible]  370 PRINI PRINT [illegible]
BC   375 PRINT"DON'T FORGET TO SET
     INE JOS  AND  FIRE$ [illegible]
     NY OTHER VARIABLES "
2A   380 PRINI PRINT WHEN [illegible]
     S "
60   382 PRINT U=UP, D=DOWN, L=LEF
     T, R=RIGHT
83   384 PRINI PRINI"WREN USING FI
     RES
60   386 PRINI"ON=FIRE ON  OFF=FIR
     E OFF "
3B   388 PRINI PRINI"KIT ANY KEY T
     O CONTINUE
C7   390 POKE198,0 WAIT198,1
EB   392 PRINICHR$(154)CHR$(147):P
     OKE53281,6
0C   395 END
45   500 DATA 120,169,0,141 14,220
     ,169,27,060
DC   510 DATA 141 17,208 169 120 1
     41,18 208,1030
52   520 DATA 169,75,141,20 3,160,
     206 141 524
B9   530 DATA 21,3,10[illegible]
```

```
[illegible]  160 [illegible]
DE   540 DATA [illegible],177,45,[illegible],081 20
     177,96,[illegible]
2D   550 DATA [illegible]
     5,133,253,1183
B3   560 DATA 208,177,[illegible],133,254
     60,85,141,1204
9A   570 DATA 16 207 169 60 141 1
     207 169,554
9C   580 DATA 76 141 10 207,169 0
     141 19 053
B2   590 DATA 207 00 86 169 1,44,
     5,208,838
FC   600 DATA 208,3,76 48 234 160
     1 160 900
9B   610 DATA 0,141,254,207 162,0
     169 32 865
AE   620 DATA 145 251 173,0,220,4
     254,207 1265
B2   630 DATA 208,0 189 16 207 14
     251 76 1100
B2   640 DATA 182 206 14 254 207 1
     38 224 4,1263
7F   650 DATA 240 232 160 5,169 3
     145 45 871
E8   660 DATA 160 1 169 70 145 25
     ,208 145 1143
73   670 DATA 253 173 0 220 41 16
     240 12 923
CM   680 DATA 160 5 169,2 145 45,
     58 1 881
B3   690 DATA 169,70 145 253 169,
     20 141,10 1101
8A   700 DATA 208 169 27 141,17 2
     0,169,1 940
66   710 DATA 141,28,200 76,49,2
     4,41,[illegible]
```

```
PROGRAM  IESI ROUTINE

0E   1 REM
7B   2 REM *** JOYSTICK IESI  ***
0C   3 REM
7B   4 REM *** BY NICK SUMNER ***
0A   5 REM
0C   6 REM ***     30/8/86     ***
08   7 REM
01   10 JOS=  " FIRE$="OFF" SYSSER
     36
04   11 REM
42   12 REM * * SET JOS & FIRES F
     RST * *
02   13 REM
35   20 A=0 B=0:X=0 Y=0 Z=0 PRINI
     HR$(147)
71   30 IFJOS="U"ANDY>0THENY=Y-1 [illegible]
     GOSUB100
47   40 IFJOS="D"ANDY<24THENY=Y+1
     GOSUB100
B7   50 IFJOS="L"ANDX>0THENX=X-1
     GOSUB100
02   60 IFJOS="R"ANDX<39THEN(=X+1
     GOSUB100
2A   70 IFFIRE$="ON"THENGOSUB200
3C   80 GOTO30
E0   100 REM
07   110 REM *** MOVE BLOCK ***
F7   120 REM
40   130 POKE55296+A+B*40 14
E2   140 POKE1024+X+Y*40,160
0E   150 POKE55296+X+Y*40 1
A0   160 A=X B=Y
24   170 RETURN
47   200 REM
B7   210 REM *** CHANGE BORDER ***
[illegible]  220 REM
EF   230 Z=Z+1
B5   240 Z=ZAND255
61   250 POKE53200 Z
0B   260 RETURN
```

Hard Copy

One of the biggest investments which a computer user makes is inevitably a printer For this reason we've put a new Citizen model through its paces

By Mycroftt Appleby

The Citizen *LSP-10* printer is one of the low end price bracket printers that is making Citizen a very big name in the peripherals world at the moment

It's easy to see why Citizen has come so far so last The *LSP 10* is a full width printer with all the facilities found on the more expensive Epsons along with NLQ and tractor/friction feed options Externally the machine is a lot smaller than its immediate opposition its dimensions being 395mm wide 255mm deep and 90mm high The control buttons comprise the usual on/off line line feed and form feed With indicators for power paper out and ready The current trend towards setting the print options (ie bold italics, NLQ etc) from the front panel is not supported here which is a shame – but this is a low cost printer

Paper and Print

The paper advance knob is well mounted on the right of the machine immediately above the interface connector Having the interface on the side of a printer is most unusual as most printers have them on the back But when you think about it, the side is a most logical place to attach cables as they then don t foul the paper feed The power cable does attach at the back but it at one corner and has a 90 degree bend on it to make the cable emerge sideways

The printer comes as standard with friction feed but a tractor option is available This feeds the paper in very easily and is one of the most trouble free paper feeds that I have come across The friction feed can also be supplemented by a sheet feeder that can feed correspondence quality paper to compliment the NLQ print Paper loading is trouble free to an extent that I hadn t thought existed after using the Epson method of loading paper When there is no paper in the machine the form feed button doubles as an auto paper load button that takes the paper from the back of the machine to in front of the print head

Print speed varies between 24 characters per second in NLQ mode and 120 cps when printing draft The draft output isn't bad but obviously isn't as good as you would expect for a printer whose main selling point is that ability With the *LSP 10* it is more of a bonus The NLQ in this case should be considered as just an easier to read matrix font you wouldn't write a letter to your bank manager with it

Interfacing

As is becoming common nowadays the interface is on a cartridge The one I had was a centronics parallel type but I believe a Commodore serial one is available The cartridge is flush fitting and is shaped in the same way as the bottom of the case Unless you know that it is there you wouldn t ever suspect it A well thought out point with the cartridge is that the dip switches are on it These are the switches that set up the different start up options and functions on the printer Usually you have to scrape around the inside of the printer or even open up the case with a screwdriver But with the *LSP-10* you can remove the cigarette packet sized unit and have it in front of you whilst you consult the manual

The dip switches in this printer are more important than in most as they set the emulation mode of the machine The printer is capable of emulating the popular (i e around 60% of the market) Epson range of printers to a greater or lesser degree This means that if you ever have screen-dump software for example, you may find that it has an Epson option on it One of the three Citizen emulation modes should suffice It can also emulate the less popular but business standard IBM graphics printer But as you don t often find these on Commodores you probably won't ever need it

Documentation

The manual is a sturdy tome, in a spiral binding that lays flat (very useful) The concept and features of the printer are introduced in a logical manner with worked examples sample outputs, and diagrams At the end of the manual there is a tear off card with all the more common escape codes indicated This saves a lot of time as I usually have to dredge through the manual making it extremely dog-eared to extract the relevant information

All the escape codes and functions are based around the common Epson standard with the usual bold, double strike compressed expanded, italic or correspondence quality styles supported The graphics capability is also good with three graphics densities up to around 1920 dots on an eight inch line There is also two speeds for the medium density print to improve quality at the cost of reducing speed You can also define your own characters on the 11X9 print format if you discard the 2k printer buffer

Verdict

Overall I can safely say that having used the printer on regular basis for the last month, that I am extremely happy with it It provides most of the facilities of the most popular printer in the world, with none of the little idio-synchrasies that get the name of Epson cursed over and at a much more reasonable price Definitely the top of my list for printers at the moment

Labeller 64

Let your C64 take the hassle out of printing name and address labels. Your C64, a printer, some address labels and this program are all that you need

By A.J. Lenton

How often have you had to type the address of a friend on to an envelope? Or perhaps you have a list of people that you need to send letters to quite often. *Labeller 64* will take the hassle out of this by keeping a record of the names and addresses that you use most often and printing a selection of them out at your command.

This is the second part of the *Labeller 64* program which was started in the *February 1987* issue of *Your Commodore*.

To enter this section of the program you should LOAD in the data you already have into the *Hex Data Entry* program and use the 'Enter Data' option to continue.

YC

PROGRAM LABELLER

```
4101 45 4E 20 4F 52 20 07 F1  72
4109 D8 52 43 4E 54 45 52 20  EF
4111 20 D3 2F D8 29 D8 EC DC  0C
4119 61 46 01 50 01 5C F5 46  0B
4201 01 53 01 5C F7 8D D4 01  27
4209 D1 0A 5A 46 01 53 01 3D  E9
4211 D4 01 D1 70 58 46 01 93  4E
4219 D8 46 1A C5 4E 54 46 52  C7
4221 20 D4 45 5F 48 43 45 20  D1
4229 CE 55 4D 42 45 52 20 83  CC
4231 F1 34 9D 03 F1 D8 03 D7  5E
4239 FF 26 FD 26 C5 FF 12 9E  53
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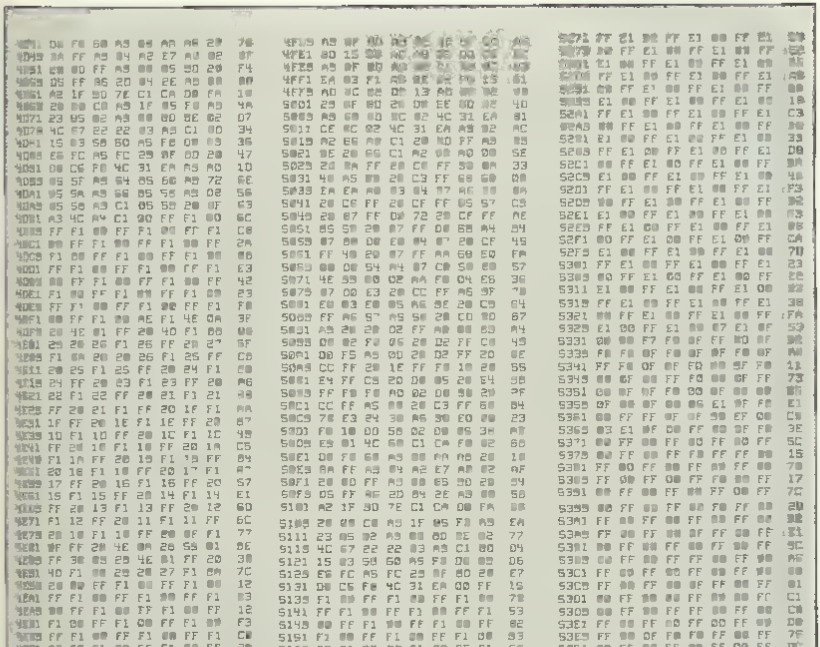

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5B81 FF 00 FF 00 FF 00 FF 00 74
5B89 FF 00 FF 00 FF 00 FF 00 53
5B91 00 FF 00 FF 00 FF 00 FF 48
5B99 FF 00 FF 00 00 FF 00 FF AE
5BA1 FF 00 FF 00 00 FF 00 FF 94
5BA9 00 FF 00 FF 00 FF 00 FF 53
5BB1 00 FF 00 FF 00 FF 00 FF A3
5BB9 FF 00 FF CF 00 1F FF 00 AE
5BC1 FF 00 FF 00 00 FF 00 FF 4A
5BC9 00 FF 00 FF 00 FF 00 FF 1E
5BD1 00 FF F0 0F 0F 00 FF 00 57
5BD9 FF 00 FF 00 FF 00 FF 00 C8
5BE1 0F 00 FD 00 00 FF 00 FF D8
5BE9 00 FF D0 FF 00 FF 00 FF D4
5BF1 00 FF 00 FF FF 30 FF D0 FE
5BF9 FF 00 FF 00 FF 00 0F 00 58
5C01 03 E1 F0 10 00 FF F0 FF 57
5C09 0C FF D0 FF 00 FF F0 01 A0
5C11 0F 0F F0 F3 0F 00 00 FF C
5C19 F0 0F FF 00 0F F0 F0 0F 15
5C21 F0 0F 0F F0 0F FF F0 0F 60
5C29 0F F0 00 7F F0 00 0F 00 BC
5C31 FF F0 00 0F FF 00 7F 0F 37
5C39 F0 00 0F C0 00 0F 10 0F 37
5C41 00 06 E1 0F F0 00 FF FF CC
5C49 0F 0F 70 FF 00 03 E1 0F 72
5C51 00 FF 00 0F F0 00 FF 00 33
5C59 FF 00 FF 00 FF 00 FF 00 48
5C61 FF FF FF 00 FF 00 FF 00 2A
5C69 00 FF 00 FF 00 FF 00 FF 54
5C71 00 FF F0 00 FF 00 FF 00 72
5C79 FF 00 FF 00 FF 00 FF 00 68
5C81 FF 00 F0 FF 00 FF 00 FF 30
5C89 00 FF 00 FF 00 FF 00 FF 74
5C91 00 5F FF 00 FF 00 FF 00 3F
5C99 FF 00 FF 00 FF 00 FF 00 9B
5CA1 FF FF 00 FF 00 FF 00 FF 48
5CA9 00 FF 00 FF 00 FF 00 FF 34
5CB1 00 4F FF 00 FF 00 FF 00 9F
5CB9 30 FF F0 00 FF 00 FF 00 AA
5CC1 FF FF 00 FF 00 FF 00 FF AE
5CC9 00 FF FF FF 00 FF 00 0F 34
```
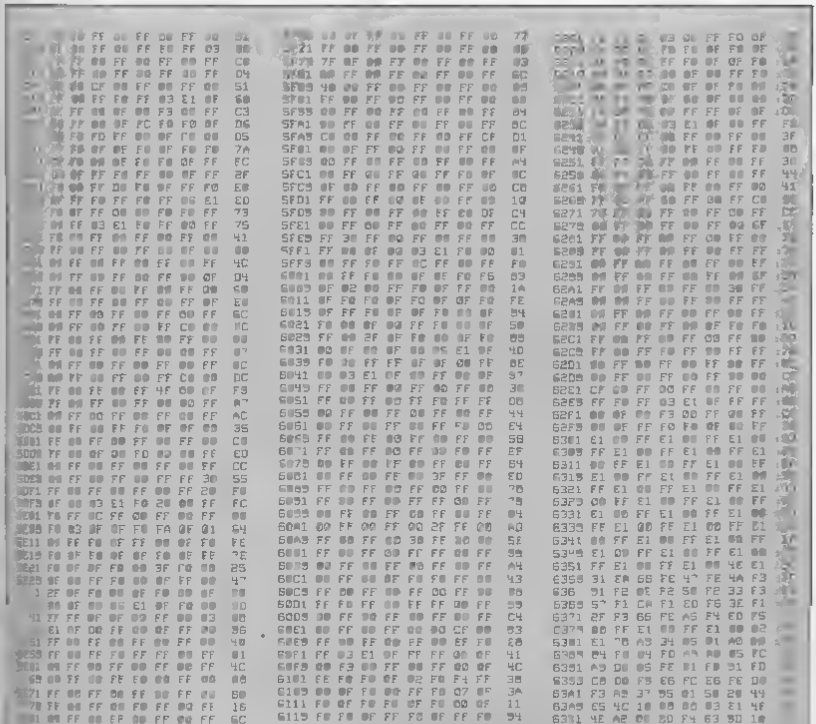



Hex Data Entry

Introducing the Your Commodore Hex Data Entry Program to make our listings even more accessible

By M.C. Stretton assisted by P.A. Eves

The *Your Commodore* Hex Data Entry program has been written with you the reader in mind No longer will it be a painstaking ordeal typing in all the long lists of data This program will ensure a 100% correct entry each and every time you use it

I have made this version as streamlined as possible so as to save you having to type in a large program There are only four options in this version LOAD DATA SAVE DATA ENTER DATA PRINT DATA There will be a much larger version coming shortly which will give lost more options and will have Windows Redefined Chars Scrolling Text etc

On first entering the Hex Data Entry only the LOAD DATA and DATA ENTRY options are available to you This is because the buffer is empty and the other two options require data to be present On selecting the LOAD DATA option, you are asked for TAPE or DISK Press either 'T' or 'O' then RETURN The program remembers that last input/output and so it is possible to just hit RETURN if the correct device type is being displayed You are then required to enter a filename

Tape users please note to cut down on errors for disk users, you will not be allowed to enter a blank filename Filenames can be a combination of any characters except graphics up to 16 in number If you should make an error in your filename entry you may either delete single characters by the DEL key or SHIFT/CLRHOME will delete the whole filename Be extremely careful when typing in your filename errors can be fatal so make sure you only use filenames that are stored on whatever device you are using After the prompt hit return and the file will be loaded into the buffer The program will allow files up to 95 blocks in length to be loaded in If you want larger programs entered you will have to split them into two or more parts first After the load control is passes back to the main menu

The save option is identical to the load except that it takes the contents of the buffer and saves them out to the given start address This will save an executable file that can be loaded and run independant of the Input program

Data Entry

The Data Entry option is the option by which you can enter data from *Your Commodore* or your own creations Once this option is selected you are asked if you want to continue from the given address If you have just 'LOADed' a file this address will be the next available byte in the buffer (Allowing you to add more data to the end of the loaded file) This is also true of the program currently in memory Therefore if you wish to continue typing in at the last address type 'Y' If 'N' is pressed the program assumes you are starting a fresh entry When this happens the buffer is reset to zero, thus losing any program currently in memory (I have chosen $C000 as the normal start up address purely because most M/C progs reside here) After pressing 'N' you are then asked for the starting address, in Hex Any valid Hex number is acceptable e g $400 $C00, $0400 In this example the first figure $400 would be interpreted as $0400 by the program Likewise $286 is taken to be $0286

Once the start address is given you are asked if you want checksums or not If you are typing in a program from *Your Commodore* your response will be 'Y' If you are entering your own program then select 'N'

The screen display now changes to show the current address being poked into Type any valid Hex number and the program automatically skips the next byte without the need to type commas spaces or returns If you make a mistake one press of the DEL key will erase the whole number If in the no checksum mode when you get to the end of the line the line will automatically scroll up ready for your next input

If in checksum mode after eight bytes are entered you must type the two digit checksum at the end of the line Unlike the no checksum mode you now press return to enter the line

If the program finds that the checksum does not match the line entered a warning tone will be sound You will then be asked if you wish to either a) Re-enter the line or b) Re-enter the checksum

After checking your line if you fi you have entered it wrongly then pr 'L' The line will be erased and y then re-enter it correctly If you fi that you have only made a mistake typing in the checksum then press C and re enter it Should you wish t stop entering data simply press retur or space bar on a blank line to get y back to the main menu Here you ma save your program so as to resta another day or you may wish to see printout

On choosing the print option y have a choice or hard copy or scree copy The listing can be paused at a time by pressing down and holdin down any key Pressing t RUN/STOP key and holding it dow will break out of the print mode a return you to the main menu

The left arrow key 'top left of t keyboard' acts as zero when typing your data The space bar acts as t return key when entering data th leaving you free from searching for t return key

The load option allows a program less than 95 blocks to b loaded into the buffer so it is possib to load a basic program obtain a He dump then resave the program out another tape or disk without harmi it in any way

I hope that this program will help take the drudgery out of typing in lo lists of data statements

```
Please use SYNTAX CHECKER
when entering this program

EC  10 REM  ---------- SETUP
    - - -------
AF  20 POKE788,52 CLR
D3  30 DO=0 EU=16384 POKE650,2
     POKE53280 12 POKE53281 12
     DKE636 1 PRINT CLR REV H,
     U SNJ
AA  35 REM SEE NOTES ON REV V
     IN LISTINGS FOR DETAILS O
     OW TO GET REV CHARACTERS
D6  40 CAS="$C000  CA=49152 SA
     A TT=0
C8  50 GOSUB2180
GE  55 PRINT"{CLR}",
EF  60 REM ------------ OPTION
    ------------
DD  70 PRINT"{HOME RVSOFF,BLAC
     C@403",
FF  80 PRINT"{RVSON BLACK} YOU
     COMMODORE HEX INPUTTER
      1986
CJ  90 PRINT"{RVSON} -DESIGNED
```

```
  10 REM THIS IS A C STRUTTEN-
  CHWORKS"
54 30 PRINT"[HOME][DOWN][3*C][10]A$[15T
  E$ BY P.M.A.W.[15*C][10,RVSOFF]
  ",                                    F9
30 100 PRINT"[WHITE,DOWN6,RIGHT
  13][F1] LOAD DATA                     AE
14 110 PRINT"[DOWN2,RIGHT13][F3
  ] SAVE DATA"                          2E
40 120 PRINT"[DOWN2,RIGHT13][F5
  ] DATA ENTRY                          AD
50 130 PRINT"[DOWN2,RIGHT13][F7
  ] PRINTER                             A0
06 140 GOSUB1250
98 150 ONFKGOSUB1850 1770,180,B
  60                                    BF
96 160 GOTO70
23 170 REM ------------ HEX INP BC
  UT  -                                 1C
B4 180 GOSUB1970
B0 190 PRINT"[HOME,DOWN,BLACK,R 93
  VSON]CONTINUE FROM[SPC27,UP, 14
  RIGHT14]",CAS
F4 200 POKE198,0:WAIT198,1:GETA
  $
F8 210 IFA$= N"THENRU=16384:GOT 07
  0240
CE 220 IFA$= Y"THENPRINT [WHITE F8
  ]"  GOTO260
C1 230 GOTO200                          6C
B0 240 PRINT [HOME,DOWN,BLACK,R
  VSON]DATA ADDRESS  $   [SPC
  2] UP RIGHT15]",
B0 250 GOSUB1320:PRINT [WHITE,R
  VSOFF]  , HH$=IN$:GOSUB1190:S C6
  A=DE:CA=DE:CAS=HH$
5A 260 PRINT [HOME,DOWN,BLACK,R
  VSON,SPC]DO YOU WISH TO ENT 14
  ER CHECKSUMS?[SPC5,RVSOFF]',
20 270 POKE198,0:WAIT198,1:GETA
  $                                     E0
B0 280 IFA$= "N"THEN22=1:GOTO310 16
                                        BD
C0 290 IFA$="Y"THEN22=0:GOTO310 26
                                        CE
11 300 GOTO270
B0 310 PRINT [CLR,WHITE]
B7 320 SYS58826                         30
0B 321 II=0                             3A
E0 325 GOSUB580                         E0
B6 330 X=SA:XA=SA:IN$=""
40 340 GOSUB1250                        61
B4 350 L=LEN(IN$)                       C3
77 360 IFA$=CHR$(20)THENGOSUB53 41
  0:GOTO340
C3 370 IFA$=CHR$(13)ANDTN=0THEN 87
  PRINT [CLR]:  RETURN                  72
12 380 IFA$=CHR$(32)ANDTN=0THEN
  PRINT [CLR]" RETURN                   B0
30 390 IFA$="-"THENA$= 0:  GOTO4 77
  30                                    02
53 400 Y=0:IFASC(A$)>47ANDASC(A 87
  $)<58THENY=1                          60
10 410 IFASC(A$)>64ANDASC(A$)<7 1B
  1THENY=1                              B0
F1 420 IFY=0THEN340                     F0
37 430 PRINTA$:  DN=DN+1:IFDN=2T 28
  KENPRINT" ", GOTO450                  3B
1B 440 IN$=IN$+A$:GOTO340               3B
1E 450 IN$=IN$+A$                       60
3E 460 HH$=IN$:GOSUB1190                B7
B0 470 POKE 8U,DE:CA=CA+1:8U=8U
  +1:DN=0:TN=TN+1:IN$= "                C9
B6 480 IFTN=8ANDZZ=1THENGOTO320 62
F8 490 IFTN=8ANDCK$=CK$THENGOTO
  320                                   DE
B0 500 IFTN=8ANDCK$<>CK$THENGOTO
  320                                   DE
B0 510 IFTN=8ANDCK$=CK$THENGOTO
  UR2040:GOTO525                        99
54 520 GOTO340                          4B
A1 525 ONGOSUB1025,526                  A1
B0 526 PRINT"[HOME,WHITE,DOWN24
  ,RIGHT37]  ,                          E9
AE 527 PRINT" .[LEFT5]  ,
14 528 GOTO450
E2 529 EU=EU-8:CA=CA-8:GOTO325          E9
AD 530 IFTN=0THENGOSUB550:RETUR
  N                                     C0
A0 540 IFDN=0THENPRINT [LEFT3]  11
  [LEFT2]", IN=IN-1:BU=BU-1:C
  A=CA-1:IN$=""  RETURN
BF 550 IFL=>1THENINS=LEFT$(IN$, 11
  L-1):PRINT [LEFT] [LEFT]  D 65
  N=DN-1
C0 560 RETURN                           1G
20 570 REM - - - - --- NEWLINE 20
  ------------
B2 580 IFEU<40551THEN585                B2
B1 581 GOSUB2560:PRINT [HOME,DO
  WN,RVSON]WARNING  BUFFER ALM C5
  OST FULL-8 BYTES LEFT[WHITE3 3B
  "
62 582 FORA=1TO4000:NEXT:GOSUB2 62
  160                                   0A
B5 585 DE=CA:GOSUB1110:CAS=LEFT 38
  $( $0000',5-LEN(HH$))+HH$             8A
C1 590 PRINT [HOME,DOWN24,RIGHT
  ,WHITE],CAS  [SPC4]                   B6
B0 600 IF22=0THENPRINT  "               8A
78 610 PRINT"[HOME,DOWN24,RIGHT
  10]"  IN=0:DN=0:IN$="  RETUR
  N                                     4E
C6 620 REM --------- CHEXUM ---
  ----------                            2B
E0 640 CK=0                             1C
B0 650 IFCA=SATHENRETURN                06
B0 660 FORX=1TO8:CK=CK+(Y*(PEEK
  ((RU-5)+X))):NEXT                     3B
26 665 CK=CK+CA-8                       B6
CE 670 CK=CK-INT(CK/256)*256:DE 0E
  =CK:GOSUB1110:CK$=MID$(HH$,3
  )                                     FA
E0 680 IFCK$<>CK$THENTT=1               3F
3A 690 RETURN
E0 710 REM -------- -- GETCHECK 36
  ------------
61 720 POKE198,0:CK$=""                 EA
C3 730 GETL$:IFL$= "THEN730             68
41 740 L=LEN(CK$):IFL$=CHR$(20)
  ANDL>0THEN760                         4S
87 750 GOTO770
72 760 CK$=LEFT$(CK$,L-1):PRINT
  "[LEFT] [LEFT] ":GOTO730              B7
B0 770 IFL$=CHR$(13)ANDL=2THENC
  K=VAL(CK$):RETURN                     34
02 780 IFL$= "ANDL=2THENCK=VAL
  (CK$):RETURN                          5D
E0 790 IFL$="- THENL$= 0"
1B 800 Y=0:IFASC(L$)>47ANDASC(L
  $)<58THENY=1                          SC
F0 810 IFASC(L$)>64ANDASC(L$)<7 AC
  1THENY=1
28 820 IFY=0ORL=2THEN730                B9
3B 830 PRINTL$,                         9C
60 840 CK$=CK$+L$:GOTO730
B7 850 REM ---------- PRINTER - F2
  ------------                          A9
B9 860 IFCA=SATHENRETURN                95
B2 870 GOSUB1970:PRINT [HOME,DO 51
  WN,RVSON,BLACK,SPC6]PRINT TO AD
  SCREEN OR PRINTER?[SPC7]  E0
B0 880 POKE198,0:WAIT198,1:GETK
  $                                     DA
B6 885 IFK$=CHR$(136)THENPRINT" 4A
  [WHITE,CLR]":RETURN
B0 890 IFK$= S"THENNU=3:GOTO940
B0 900 IFK$= P"THENNU=4
A1 910 IFK$<>"S"ANDK$<>"P"THEN9
  00                                    E9
B0 920 PRINT [HOME,DOWN,BLACK,R
  VSON]  SWITCH ON PRINTER THE
  N PRESS RETURN[SPC3]"
E9 930 POKE198,0:WAIT198,1:GETA
  $:IFA$<>CHR$(13)THEN920
C0 940 OPEN3,NU,PRINT#3
11 950 FS=16384:FE=16384+(CA-SA
  )/FC+FS:AS=SA:IFFE=FSTHEN1000
  0                                     0
B0 960 PRINT"[CLR]
B7 970 IFPEEK(197)=63THENPRINT"
  [WHITE,CLR]":AS=CA:GOTO1080
B7S 1FPEEK(203)<>64THEN970
20 980 DE=AS:GOSUB1110:CAS=LEFT
  $( 0000 ,4-LEN(HH$))+HH$              B2
B0 990 CA=0:PRINT#3  (SPC4)",CA
  $
1000 FORX=0TO7:O=PEE(O)                 C5
1010 DE=PEEK(PC+X):GOSUB1110 3B
  :B$=RIGHT$(HH$,2)
1020 PRINT#3   " B$  NEXTX              62
1030 GOSUB1530                          0A
1040 PRINT#3    +CH$                    38
1050 PC=PC+8:AS=AS+8:KA=KA+8 8A
  :KB=KB+8
1060 IFPC<PETHENGOTO970                 B6
1070 IFNU=3THENPOKE198,0:WAIT
  198:1                                 8A
1080 PRINT [CLR]" DE=AS:GOSUB 4E
  1110:CAS=LEFT$( $0000',5-LEN(HH$))+HH$
1090 POKE198,0:PRINT#3:CLOSE 2B
  NU:PRINT"[CLR]" RETURN
1100 REM -------  DEC HEX --
  ---------                             1C
1110 A=INT(DE/256):B=DE-A*25 06
  6:C=INT(A/16):D=A-16*C
1120 D$=CHR$(48+D):IFD>9THEN 3B
  C$=CHR$(C+55)
1130 D$=CHR$(48+D):IFD>9THEN
  D$=CHR$(D+55)                         0E
1140 E=INT(B/16):F=B-16*E               FA
1150 E$=CHR$(48+E):IFE>9THEN 3F
  E$=CHR$(E+55)
1160 F$=CHR$(48+F):IFF>9THEN 36
  F$=CHR$(F+55)
1170 HH$=C$+D$+E$+F$:RETURN             EA
1180 REM -- --------- HEX-DE 68
  C ---------  -
1190 IFLEN(HH$)<4THENHH$=LEF 4S
  T$( 0000"+HH$,4-LEN(HH$))+HH
  $
1200 A=ASC(HH$)-48:B=ASC(MID B7
  $(HH$,2,1))-48
1210 C=ASC(MID$(HH$,3,1))-48:
  D=ASC(MID$(HH$,4,1))-48
5D 1220 DE=256*(16*(A+7*(A>9))+ 1B
  B+7*(B>9))+16*(C+7*(C>9))+D+
  7*(D>9)
SC 1230 RETURN
AC 1240 REM --------- --- F KEY
  S  ---------                          B9
B9 1250 FK=0                            9C
1260 POKE198,0:WAIT198,1:GET 
  A$                                    F2
1270 IFA$=CHR$(133)THENFK=1 A9
1280 IFA$=CHR$(134)THENFK=2 95
1290 IFA$=CHR$(135)THENFK=3 51
1300 IFA$=CHR$(136)THENFK=4 AD
1310 RETURN                             E0
1320 REM ---------- GET ADDR
  ESS ---------                         DA
1330 IN$="
1340 GETL$:IFL$= "THEN1340
```

```
1350 L=LEN(INS) IFLS=CHRS(20)THEN
)ANDL>0THEN1370
1360 GOTO1380
1370 INS=LEFTS(INS,L-1) PRIN 20
T"[LEFT] [LEFT]"  GOTO1340  D1
1380 IFLS=CHRS(13)ANDL>0THEN
RETURN
1385 IFLS=CHRS(32)ANDL>0THEN
RETURN                       57
1390 FLAG=0 IFASC(LS)>47ANDA 1A
SC(LS)<58THENFLAG=1
1400 IFASC(LS)>64ANDASC(LS)<
71THENFLAG=1                 96
1410 IFFLAG<>1THENGOTO1340
1420 IFL=4THENGOTO1340       BC
1430 PRINTLS
1440 INS=INS+LS GOTO1340     6B
1450 REM ---------- FILENAME
 ----------                  BA
1460 PRINT"CHOME DOWN,RVSON  D8
BLACK]FILENAME  [CSPC10]CSP E1
C12,UP,RIGHT11'",
1470 FLS= "                  7D
1480 GETAS IFAS=  THEN1480
1490 L=LEN(FLS)              88
1500 IFAS=CHRS(20)ANDL>0THEN
1530                         72
1510 IFAS= [CLR]"THEN1460
1520 GOTO1550                C5
1530 FLS=LEFTS(FLS L-1) PRIN
T"[LEFT] [LEFT]"             A3
1540 GOTO1480
1550 IFAS=CHRS(13)ANDL>0THEN
1610                         56
1560 IFAS=CHRS(32)THEN1580
1570 IFASC(AS)<32ORASC(AS)>9
OTHEN1480                    D8
1580 IF L=16THEN1480         D6
1590 PRINTAS                 3D
1600 FLS=FLS+AS GOTO1480     DS
1610 FORX=1TOLEN(FLS) POKE83
2+X ASCCHRID$(FLS X 1)) NEXT
1620 POKE183 L               SF
1630 RETURN                  D1
1640 REM ------------ LOAD -  5E
------------                 .
1650 GOSUB1970 GOSUB1880 GOS 6D
UB1490                       A2
1660 IFDV=1THENPRINT CHOME,D 8E
OWN BLACK RVSON]  PLACE TAPE
 IN DECK THEN PRESS  PLAY
[CSP]  GOTO1720              E2
1670 PRINT"CHOME DOWN,BLACK  EO
RVSON] PLACE DISK INTO DRIVE
 THEN HIT RETURN  [CS]       77
1680 POKE198,0 WAIT198 1 GET
AS IFAS<>CHRS(13)THEN1680    F4
1690 PRINT"CHOME DOWN BLACK
RVSON]LOADING[SPC33]         AF
1700 PRINT CRVSON UP3 RIGNIB 16
]",FLS                       5F
1710 SYS45244 GOTO1730       C2
1720 SYS45152                F6
1730 A=PEEK(828) B=PEEK(830) 19
:C=PEEK(831) D=PEEK(832)
1740 SA=(256*B)+A CA=(256*D) D7
+C 52=CA 5A 8U=8U+52
1745 DE=CA 1 GOSUB1110 CAS=L OC
EFTS( $0000  5 LEN(HKS))+HKS 8O
                             A5
1750 RETURN
1760 REM ---------- SAVE -
----------                   AB
1770 IFCA=SATHENRETURN
1780 GOSUB1970 GOSUB1880 GOS
UB1490                       AA
1790 A=SA-INT(SA/256)*256 B=
INT(SA/256) POKE828,A POKE83
0,B
1795 C=CA-INT(CA/256)*256 D=  B4
INT(CA/256) POKE831 C POKE83
2,D                          8C
1797 IFDV<>1THEN1820
1800 PRINT"CHOME,DOWN BLACK, 1F
RVSON]PLACE TAPE IN DECK THE
N PRESS 'REC-PLAY [CS]  SYS4 23
9803 SYS45206
1810 RETURN                  4F
1820 PRINT CHOME DOWN, BLACK
RVSON] PLACE DISK INTO DRIVE DC
 THEN HIT RETURN  [CS]
1830 POKE198 0 WAIT198 1 GET 66
AS IFAS<>CHRS(13)THEN1830
1840 PRINT CHOME DOWN BLACK  DC
RVSON]SAVING[SPC34]
1850 PRINT CRVSON UP3,RIGHT7 4A
]  FLS
1860 SYS45343                F6
1870 RETURN
1880 REM ---------- TAPE OR 02
DISK ---- -
1890 PRINT CHOME DOWN BLACK 63
RVSON]TAPE OR DISK [SPC2"]
1900 IFDV=1THENPRINT CHOME D CA
OWN RIGHT14]TAPE[SPC22]'
1910 IFDV=0THENPRINT"CHOME D 2D
OWN RIGHT14]DISK[SPC22]",
1920 POKE198 0 WAIT198 1 GET 0C
AS
1930 IFAS= I"ANDDV=0THENPRIN 6C
T CHOME DOWN,RIGHT14 RVSON]T
APE  DV=1                    04
1940 IFAS= D ANDDV=1THENPRIN
T CHOME DOWN RIGHT14 RVSON]D C4
ISK  DV=0
1950 IFAS=CHRS(13)THENRETURN E8
1955 IFAS=CHRS(32)THENRETURN
1960 GOTO1820                23
1970 PRINT"CHOME]"  FORA=1TO
4 PRINT"CSPC40]"  NEXT       E2
1980 REM --  - PRINT CHECK
SUM --------                 6C
1990 CH=0 A=X8-8 FORX=1TO8
2000 CH=CH+(X*(PEEK((PG-1)+X 6A
))) NEXT                     63
2005 CH=CH+PC                6D
2010 CH=CH-INT(CH/256)*256   0E
2020 DE=CH GOSUB1110 CHS=MID
$(HHS 3) RETURN              76
2030 REM -      - CHECKSUM ER
ROR -----                    81
2040 PRINT CHOME BLACK RVSOF EO
F C0"]"                      3A
2050 PRINT CRVSON]INPUT ERRO
R - RE-ENTER [WHITE]CC[BLACK] BC
INE OR [WHITE]CC[BLACK]CHECKSU
M
2060 PRINT CRVSOFF CT40]"    C8
2070 GOSUB2560               C4
2080 GETAS IFAS=  THEN2080   21
2090 IFAS= L"THENQQ=1        56
2100 IFAS= C THENQQ=2        13
2105 IFAS<>"C"ANDAS<>"L THEN
2080                         D7
2160 PRINT"CHOME]"  FORA=1TO
3 PRINT"CSPC40]",  NEXT      OC
2170 RETURN                  EO
2180 I=45152                 A5
2185 PRINT CCLR DOWN10 RIGHT
7]PLEASE WAIT ONE MOMENT
2186 PRINT CHOME DOWN11 RIGH 04
T7 CT283                     78
2190 READ A IF A=256 THEN RE
TURN                         AA
2200 POKE 1,A I=I+1 GOTO 219 25
0
2210 DATA 32,44,247,173,60,
,133,255                     EE
2220 DATA 169,0,133,193,169,
64,133 194
2230 DATA 56,173,63,3,237 6
,3,170
2240 DATA 173,64 3,237,62,3,
168 24
2250 DATA 136 101 193 133 17
4,152 101 194
2260 DATA 133 175 32,162 24
,165 255 141
2270 DATA 60,3,56 32 183 24
169,0
2280 DATA 133,193,169 64 13
194 56 173
2290 DATA 63 3,237 61,3 170,
173 64
2300 DATA 3,237 62,3,168 24,
138 101
2310 DATA 193 133 174 152 16
1,194 133 175
2320 DATA 32 124 246 56 165,
56 133 185
2330 DATA 169 1,141,60,3 13
,194,169
2340 DATA 8 133 186 168 0 1
3 185,133
2350 DATA 147 169 65,133 18
169 3 133
2360 DATA 188 169,64,133 19
164 183 32
2370 DATA 175 245 32 213 24
,165 186 32
2380 DATA 3 237 165 185 32
53 237 32
2390 DATA 19,238 141,61 3 3
,19 238
2400 DATA 141 62 3 32 232 2
4 165 174
2410 DATA 141 63 3,56,169 1
5 233 64
2420 DATA 141,64,3,24 173 6
3 105
2430 DATA 63 3 141 63 3 173
62 3
2440 DATA 105 64 3 141,64,3
56 169
2450 DATA 57 133 185,169 1,
33 184 169
2460 DATA 8 133,186,169,65
33 187 169
2470 DATA 3,133,188 165 185
164 183 32
2480 DATA 213,243,32,143 24
165 186 32
2490 DATA 12 237 165,185 32
185 237 165
2500 DATA 0,133 172 165 64
33 173 56
2510 DATA 173,63 3 237 61,3
133 174
2520 DATA 173 64 3 237 62 3
133 175
2530 DATA 24 165 64,101,175
133 1"5,173 61,3
2540 DATA 32 221,237 173,62
3 180,0
2550 DATA 32 33 246 56 256
2555 REM ********** SOUND *
**********
2560 POKE 54296 15 POKE 5427
7 0 POKE 54278 200
2570 POKE 54273 40 POKE 5427
2 00 POKE 54276 17
2580 FOR T=1 TO 300 NEXT FOR
E 54276 0 POKE 54277 0 POKE
54278,0 RETURN
```

Superbowl Sunday

American football fans wake up We bring you the chance to win a copy of the new Nexus football game.

In the aftermath of the actual Superbowl final between the New York Giants and the Denver Broncoes, we've decided to prolong the spirit of the occasion by running a special American football competition

Nexus has recently released a new game to thrill fans, entitled *Superbowl Sunday* Now C64 owners can experience the real excitement of a Superbowl final

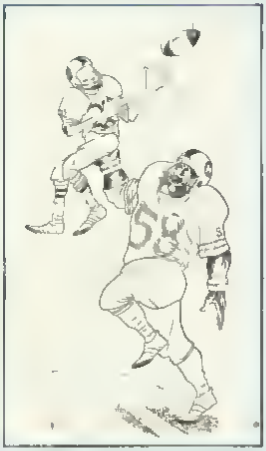
We have 30 copies of this C64 game to give away, so read on to find out how you can be the new keyboard refridgerator

How to Enter

Study the two pictures on this page There are several differences between them Mark the differences which you can find and then fill in the coupon Please write the number of differences which you have found on the back of your envelope if you forget to do this, your entry will be void

The Rules

Entries will not be accepted from employees of Argus Specialist Publications and Nexus This restriction also applies to employee's families and agents of the company The How to Enter section forms part of the rules The editor's decision is final and no correspondence will be entered into



Superbowl Competition Entry Coupon

Name
Address

postcode
Number of differences found

Send your entry to Superbowl Competition Your Commodore 1 Golden Square, London W1R 3AB Closing date Friday 27 March 1987

WIMPS and Much More

For those of you who found our WIMP Program useful here are a couple of additions to make it easier and more enjoyable

By Allen Webb

Ease of use is often a major factor taken into consideration by programmers when they are summing up a program's usefulness. This is why I have decided to provide this addition to the Wimp program which appeared in the December 1986 issue of *Your Commodore*.

After writing the demonstration routine I felt that whilst it was instructive it didn't give you anything to work from. I have therefore prepared a universal menu routine to use with the package. This routine is given in Listing 1.

The meat of the routine occupies lines 60000 onwards. To use the routine you must first pass the following prameters:

ME$ MENU STRING
MW MENU WIDTH
MH TOTAL MENU HEIGHT
XL X COORDINATE TOP LEFT CORNER
YL Y COORDINATE TOP LEFT CORNER+1
C1 C2 MENU COLOURS

The routine will then draw the menu and set up the pointer. The routine detects the movement of the pointer and highlights the menu options or "last page" icon when they are pointed t. The button press is detected if an option has been selected and the routine exits with the following information:

TASK=OPTION SELECTED
LP=0 IF MENU ITEM
LP=1 IF LAST PAGE

You can use the values of TASK and LP to direct the logic of the rest of your program.

Input Instructions

The idea of this series is to provide a set of routines which can be used in more serious applications to reduce the toil of programming.

One pain in the neck is the INPUT instruction. Most software requires the input of information and it is of essence that such operations are both user friendly and idiot-proof. The Basic INPUT has several drawbacks and is not suitable for serious software. Many programmers use either GET or INPUT using a logical file opened to the screen.

It becomes particularly irritating if you want to limit the characters to be accepted. For example what if you want to prompt for a response using only Y or N? One way is the routine:

```
10 GET I$ IF I$< > Y' OR
I$ < > N' THEN 10
20 IF I$= Y' THEN
```

This is simple enough but if you want to accept a larger group of characters the routine becomes messy.

The use of a user defined input routine appeared to be the answer. Such a routine should have the following features:

1) The routine should provide a flashing prompt, easily placed at a specified screen position.
2) A list of acceptable characters should be easily set up.
3) The routine should image the input to screen to allow the user to see what has been input. The ability to delete incorrect characters should be available.
4) The input should be easily limited to a specified length. The input should ignore the screen contents. These will allow the use of formatted displays.
5) The input should be returned in a specific string variable.
6) The routine should ignore a null input.

Such a routine is given in Listing 2. This routine provides all of the features described (the DEL key is used to correct inputs).

This routine has a rather peculiar syntax:

```
SYS 12*4096 B$ A$,X Y IL
```

where:

B$ string to hold input
A$ string specifying acceptable

characters
X X coordinate of input prompt
Y Y coordinate of input prompt
IL length of input

Listing 3

```
100 A$= ABCDEFGHIJKLMNOP
QRSTUVWXYZ
110 A$=A$+'0123456789+-*?!/$@'
130 IL=10 B$=' FORI=1TOIL B$=
B$+CHR$(32) NEXT
140 SYS12*4096 B$ A$ 0 10 IL
150 PRINTCHR$(14)B$
160 GETI$ IF I$= THEN160
```

In Listing 3 lines 100 and 110 set up the list of acceptable characters in A$. The input length is limited to 10 in line 20 (variable IL). B$ is set up with 10 spaces. This string will hold the input and must clearly be long enough to hold the full input. Line 140 gets the input with a prompt at the start of line IL.

The routine will put the input at the place where B$ is defined. It for example you replaced line 130 with

```
130 IL=10 B$= [5SPC]
```

If after using the routine, you were to list the program you would find that line 140 had been altered. The reason is that if a string is defined in a program then Basic doesn't bother setting up the string elsewhere. Using the form given in Listing 3 forces Basic to set up the variable B$ and therefore prevents corruption of the program.

Listing 4 gives a demonstration of a simple menu requiring a single key input. It should show how easy the routine is to use.

Listing 4

```
100 A$= DEISP
110 IL=1 B$=CHR$(32)
130 PRINTCHR$(147)CHR$(17)
TAB(16)'MAIN MENU'
140 PRINTCHR$(17)TAB(14) 1
INITIALISE'
150 PRINTCHR$(17)TAB(14)"E
ENTER RECORD'
160 PRINTCHR$(17)TAB(14) D
DELETE RECORD
170 PRINTCHR$(17)TAB(14)"S
SEARCH'
180 PRINTCHR$(17)TAB(14)"P
PRINT REPORT'
190 PRINTCHR$(17)CHR$(17)TAB
(7) SELECT OPTION BY ENTER-
ING
200 PRINTTAB(7) 'INDICATED
KEY & PRESSING'
210 PRINTTAB(7)' RETURN'
2000 SYS12*4096,B$ A$ 14 16 IL
2010 PRINTCHR$(17)TAB(13)
CHR$(18)B$" WAS SELECTED"
```

That's all for this month. I haven't decided what to tackle next time but I'll think of something. Don't forget let me have your comments (preferably no abusive) and suggestions via the editor.

PROGRAM 1 LISTING 1

```
B4  1 REM ******************
CE  2 REM *     LISTING 1  *
7A  3 REM ******************
AD  10 SA=12*4096
C6  20 SYS SA+21,53248: REM UPPER
    CASE
51  30 S/S SA+27  REM DEFAULT SCR
    EEN
7A  40 A$="CONTUE*SAL MENU ROUTINE
    S/S SA+33 A$ 1 7,8 0 SYS8A*
    40
1F  50 MW=14 MH=6 XL=4 YL=5 XP=CX
    L 1?=?L YP=YL+(MH 3 C1=2 C2=
    .0
DA  60 MES= CCA 5*12 CS3
53  70 MES=MES+"CS 3  OPTION 1  C
    S 23  OPTION 2  CS 23  OPTION
    3  CS-2 SPC+3E)"TCSPC4 S 3
BC  80 MES=MES+ "C2 5*12 CM3
FF  100 REM*********************
    ***********
BC  110 REM ENTER WITH MES=MENU S
    TRING
A1  120 REM MW=MENU WIDTH
71  130 REM MH=TOTAL MENU HEIGHT
31  140 REM XL=X COORDINATE TOL L
    EFT CORNER
E5  150 REM YL=Y COORDINATE TOL L
    EFT CORNER+1
A7  160 REM C1 C2= MENU COLOURS
FD  170 REM EXIT WITH TASK=OPTION
    SELECTED
3D  180 REM LP=0 IF MENU ITEM  LP
    =1 IF LAST PAGE
71  190 REM*********************
    ***********
7B  200 GOSUB60800
BC  210 IF LP=1 THEN30
43  220 IF TASK<>4 THEN 200
BE  230 PRINTCHR$(147) SYS5A*60 S
    YS5A*9 END
FF  60000 SYS SA+54 MES YL 1,YL,M
    W 0 3,C1 C2  RF=0 LP=0 FL=0
BC  60010 SYS SA+40
B7  60020 SYS SA+57 1 11 POKE608
    16
F0  60030 ROJ=B68  COL=B70  SYS S
    A+15,C1 C2
13  60040 IF PEEK(B68 =0 AND ? RF
    >0) OR  FL>0) THEN 60470
D7  60050 XC=PEEK(COL)  YC=PEEK P
    OW)
D8  60060 IF  XC<XL  OR  XC>XP  O
    R (YC<YL) OR (YC>YP) THEN 601
    10
A8  60070 IF RF>/C THEN 60090
FD  60080 IF RF<>0 THEN S/S SA+42
    YL RF MW 1 2
98  60090 RF=YC  S/S SA+42 YL RF
    MW 1 2
F5  60100 GOTO 60040
48  60110 IF (XC>36) AND (XC>=0)
    AND (YC<2  THEN 60150
62  60120 IF FL=1 THEN FL=0  S S
    SA+15 1 15  SYS SA+42 37 0 2
    P P  S/S SA+15 C1 C2
4C  60130 IF RF=0  THEN 60010
3A  60140 SYS SA+42 YL RF MW 1 2
    RF=0 GOTO60040
3C  60150 IF FL=0 THEN FL=1  S/S
    SA+15 11 15  SYS SA+42 37 0 2
    2  S/S SA+ 5 C1 C2
1D  60160 CMTO60010
73  60170 IF FL=1 THEN FL=0  GOTO
    60150
49  60180 TASK=RF /L+1 RETURN
F0  60190 LP=1 RETURN
```

PROGRAM LISTING 2

```
D3  2000 FORL=BTO18;CX=0 FORD=BTO
    15 READA CX=CX+A:POKEA9152+L*
    16+D A NEXTD
82  2010 READA IFA<>CXTHENPRINT"E
    RROR IN LINE",2040+(L*10) STO
    P
0F  2020 NEXTL END
76  2040 DATA160 100,169 32 153 5
    2 3 136 208 250 32 189 192 16
    5 34 133 1A9
E8  2050 DATA170 155 35 133 171,3
    2 165 192 32 182 192 32 181 1
    92 165 28 20?3
9F  2060 DATA141 231 3 32 151 192
    155 20 141 236 3 32 151 192
    165 28 1343
B4  2070 DATA191 228 3 32 201 192
    160 0 148 228 3 32 228,255 2
    08 12 2064
C3  2080 DATA172 229 3 32 0 193 3
    2 8 153 76 59 192 201 13 240
    69 171
F8  2090 DATA200 20 208 19 172 32
    3 3 192 0 240 224 136 208 229
    3 169 2258
B1  2100 DATA32 145 253 76 59 192
    172 229 3 224 228 3 240 205
    168 0 2201
A8  2110 DATA229 251 240 5 200 20
    4 238 3,208 246 76 59 192 172
    229 3 2533
53  2120 DATA153 62 3 32 40 193 1
    45 253 204 228 3 240 174 208
    238 228 2597
BC  2130 DATA3 76 59 192 172 229
    3 240 162 168 0 185 62 3 145
    178 1061
54  2140 DATA224 223 3 240 3 200
    208 243 56 32 253 174 32 158
    173 32 2280
1C  2150 DATA'65 182 141 232 3 56
    165 34 133 251 165 35 133 25
    2 56 32 2116
CK  2160 DATA253 174 32 138 173 3
    2 247 183 56 165 4 133 254 18
    5 0 133 2198
A3  2170 DATA253 172 238 3 192 8,
    240 16 24 165 253 105 40 133
    253 162 2244
56  2180 DATA254 105 0 133 254 13
    6 208 240 24 165 253 109 231,
    3  33 253 2581
D8  2190 DATA165 254 105 0 133 25
    4 56 140 132,3 169 108 162 18
    0 208 200 2214
59  2200 DATA253 136 208 249 172
    132 3 56 172 229 3 177 253 14
    1 51 3 2207
7E  2210 DATA44 61,3 16 3 177 253
    41 127 145 253 76 36 193 177
    253 1864
B0  2220 DATA3 128 145 253 32 247
    197 56 201 64 176 1 56 201 1
    2  175 2149
[illegible]
```

Listings

Get it right first time with our deluxe program system for the C64

You may have noticed that our listings are free of those horrible little black blobs which send you searching around the keyboard for a suitable graphic symbol. You may also have noticed the funny numbers by the side of each line of the listing. Fret no more it's all part of our easy entry aid.

Instead of those nasty graphics and rows of countless spaces in PRINT statements and strings we use a special coding system. The code or mnemonic, is always contained in square brackets and you'll soon learn to decipher their meanings.

For example [SA] would mean type in a Shifted A, or an ace of spades in layman's terms and [SA10] would mean a row of ten of these symbols.

[S+2] means hold down the shift key and press the plus key twice. It doesn't take a great leap of logic to realise that [C+2] means exactly the same thing except that the Commodore key (bottom left of the keyboard) is held down instead of the shift key.

If more than two spaces appear in a statement then this will be printed as [SPC4] or exceptionally, [SSPC4]. Translated into English this means press the spacebar four times or in the latter case hold the shift key down while you do it.

A string of special characters could appear as

[CTRL N, DOWN2 LEFT5 BLUE, F3,C3]

This would be achieved by holding down the CTRL key as you press N, press the cursor key down twice, the cursor left key five times, press the key marked BLUE while holding down the CTRL key, press the F3 key and, finally hold the Commodore key down while pressing the number two key (C2 would of course make the computer print in brown)

Always remember that you should only have a row of graphics characters on your screen with no square brackets and no commas, unless something like this appears

[SS] [C*]

In this case the two characters should have a comma between them.

On rare occasions [REV T] will appear in a listing. This is a delete symbol and is created by entering the line up to this mnemonic. Then type a closing quotation mark (SHIFT & 2) and delete it. This gets the computer out of quotes mode. Hold down CTRL and press the number nine key (RVSON), type the relevant number of reversed T's and then hold down CTRL and press zero (RVSOFF). Next type another quotation mark and delete it again. Now finish the line and press RETURN.

A list of these special cases is given in the table but remember that only one of these mnemonics will appear outside of a PRINT string, the symbol for pi. This may appear when its value is needed in a calculation so this may look something like

CC=2*[PI]*R

Ignore the square brackets and just type in a shifted upward pointing arrow (ie. the pi symbol)

```
PROGRAM  SYNTAX  CHECKER

5 REM SYNAX CHECKER - ERIC DOYLE

10 BL=10    LN=70    SA=49152
20 FOR L=0 TO BL CX=0 FOR A=0 TO
 15
30 READ A IF A>255THENPRINT"NUMB
ER 10 LARGE" LN=L*10: STOP
40 CX=CX+A:POKE SA+L*16+A NEXT
 A
50 READ A IF A<CX THENPRINT"ERR
OR IN LINE" LN=(L*10): STOP
60 NEXT L:SYS 49152 NEW
70 DATA 173 5 3 201 185 208 31 1
20 169 5 141 32 208 141 33 208 1
847
80 DATA 185 7 141 134 2 169 13 3
2 210 255 169 54 141 4 3 185 188
2
90 DATA 152 141 5 3 85 56 120 16
8 184 141 4 3 169,165 141 5 1568

100 DATA 3 169 14 141 134 2 141
32 208 169 6 141 33 208 88 96 15
85
110 DATA 32 124 165 72 138 72 15
2 72 162 0 165 20 133 254 165 21
 1747
120 DATA 24 101 254 133 254 165
0 2 240 18 68 654 133 254 232 18
8 2346
130 DATA 0 2 240 8 24 101 254 13
3 254 232 208 233 165 1 141 134
2134
140 DATA 2 165 254 74 74 74 74 3
2 158 162 32 210 255 165 254 41
2054
150 DATA 15 32 158 162 32 210 25
5 169 13 32 210 255 169 13 32 21
0 1585
160 DATA 255 169 7 141 134 2 104
 168 104 170 104 96 24 105 48 20
1 1838
170 DATA 58 16 1 96 24 105 7 96
0 0 0 0 0 0 0 0 403
```

by Eric Doyle

Checksum Program

The hexidecimal numbers appearing in a column to the left of the listing should not be typed in with the program. These are merely checksum values and are there to help you get each line right. Don't worry if you don't understand the hexadecimal system as long as you can compare two characters on the screen with the corresponding two characters in the magazine you can use our line checking program.

Type in the Checksum Program, make sure that you've not made any mistakes and save it to tape or disk immediately because it will be used with most of the present and future listings appearing in Your Commodore.

At the start of each programming session, load Checksum and run it. The screen will turn brown with yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.

If the two values don't relate to one another you have not copied the line exactly as printed so go back and check each character carefully. When you find the error simply correct it and press RETURN again.

If you want to turn off the checker simply type SYS49152 and the screen will return to the familiar blue colours. You can then do whatever it was you wanted to do and if this doesn't use the area where Checksum lies you can go back to it with the same SYS command.

No system is foolproof but the chances of two errors cancelling one another out are so remote that we believe our listings are more reliable than any other magazine in the world. So get typing!

Mnemonic	Symbol	Keypress
[RIGHT]		CRSR left/right
[LEFT]		SHIFT & CRSR left/right
[DOWN]		CRSR up/down
[UP]		SHIFT & CRSR up/down
[F1]		f1 key
[F2]		SHIFT & f1 key
[F3]		f3 key
[F4]		SHIFT & f3 key
[F5]		f5 key
[F6]		SHIFT & f5 key
[F7]		f7 key
[F8]		SHIFT & f7 key
[HOME]		CLR/HOME
[CLR]		SHIFT & CLR/HOME
[RVSON]		CTRL & 9
[RVSOFF]		CTRL & 0

Mnemonic	Symbol	Keypress
[BLACK]		CTRL & 1
[WHITE]		CTRL & 2
[RED]		CTRL & 3
[CYAN]		CTRL & 4
[PURPLE]		CTRL & 5
[GREEN]		CTRL & 6
[BLUE]		CTRL & 7
[YELLOW]		CTRL & 8
[POUND]		£
[LARROW]		←
[UPARROW]		↑
[PI]		SHIFT & ↑
[INST]		SHIFT & INST/DEL
[REV T]		see text
[Cletter]		CBM + letter
[Sletter]		SHIFT + letter

Software for sale

If you think that one of our programs looks very interesting, but you can't afford the time to type it in then our software service will help you out

It's three o'clock in the morning. You sit at the computer keyboard just finished a marathon typing session entering one of the superb programs from *Your Commodore*. Your fingers reach for the keyboard and press the letters R U and N. You press RETURN, sit back and nothing happens.

Everyone has probably faced this problem. When it does happen it's a matter of spending hours searching through the program for any typing mistakes. No matter how long you look or how many people help you, you can usually guarantee that at least one little bug slips through unnoticed.

The *Your Commodore* Software Service makes available all of the programs from each issue on both cassette and disk at a price of £6.00 for disk and £4.00 for cassette. None of the documentation for the programs is supplied with the software since it is all available in the relevant magazine. Should you not have the magazine then back issues are available from the following address:

INFONET LTD, Times House, 179 The Marlowes, Hemel Hempstead, Herts, HP1 1BB
TEL: (0442) 48435

please contact this address for prices and availability.

The Disk

Programs on the disk will also be supplied as totally working versions, i.e. when possible we will not use Basic Loaders thus making use of the programs much easier. Unfortunately at the moment we cannot duplicate C16 and Plus/4 cassettes. However programs for these machines will be available on the disk.

What programs are available?

At the top of each article you will find a strap containing the article type, C64 Program etc. So that you can see which programs are available on which format you will also find a couple of symbols after this strap. The symbols have the following meaning:

This symbol means that the program is available on cassette.

These programs are available on disk.

Please Note

Since the programs supplied on cassette are total working versions of the program we do not put disk only programs on tape. There is no sense in placing a program that expects to be reading from disk on to tape.

OCTOBER 1986

CROSSWORD — Pit your wits against your computer.
POP UP MENUS — A superb routine that allows you to add pop-up menus to your C64.
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ORDER CODE
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JANUARY 1987

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ORDER CODE
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Cassettes or disks are available back to March 1986. Please ring the Editorial office (01-437-0626) for details of these.

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CP/M: The Third Facet of the 128

The C128 has three modes – 64, 128 and the much neglected CP/M. In this article we bring you a pocket guide to CP/M and shed light on its uses.

By Mycroftt Appleby

The Commodore 128 comes with CP/M+ as the operating system for the built in Z80 second processor. However the documentation is sparse and confusing and information on the supplied utility software is rare. Read on and you may hear something to your advantage.

CP/M started life as a monitor for the newly introduced Intel 8080 processor evaluation kit and was written by one of its employees. CP/M in those days (c1973) stood for Control Program/Monitor. This monitor handled things like the paper tape reader and writer, punched cards and a line printer as well as the teletype console to which it was attached.

After a short while Shugart came on the scene. Shugart had just developed the mini disk drive by shrinking the normal eight inch IBM drives down to a handier five inch size. The problem was that they had no real software to make them work. So Shugart asked the chap who wrote CP/M if he could do something with them and make the whole system work together. This was duly done and the early CP/M had taken shape.

Intel however, didn't want to market this program, so the chap left Intel, worked all the bugs in the program out, set up his own company, and CP/M 1.4 was launched on an unsuspecting public.

The company started out life called Intergalactic Digital Research but a bank manager probably talked them into dropping the 'Intergalactic'. CP/M was further refined into CP/M 2.2 and the 'standard' CP/M system was defined as a Z80 processor, 64K of memory, between one and eight disk drives and an 80 × 25 screen. As long as your system had these minimums, software would run. This held immense attractiveness for software houses as instead of writing dozens of different versions of a program for all the different machines, they could just write a CP/M program and put a little program on the same disk that would ask the user to describe what was different about the CP/M system from everybody elses and you're away.

At about this time CP/M was deemed to mean 'Control Program/Microcomputers', as it was though that reminding people that this program was just an easy way to hook up paper tube punchers to 8080 development systems (a development system looks like a circuit board with a calculator display and a small keypad – that it!) would just confuse them – they were probably right though when you know that explains a lot of things!

In around 1980 memory was getting a bit cheaper and all sorts of bodges were being used to get more memory into CP/M systems than the 64K allowed for (64K in 1973 was uncomprehendingly huge). So Digital Research) wrote CP/M 3.0 CP/M+ to cater for it. Up until now CP/M contained a number of components. A boot ROM that loaded CP/M off disk and into memory, BIOS or Basic Input/Output System to handle the paper tape/keyboard printer etc. a BDOS to handle the disks, and the CCP – or Console Command Processor which actually does all the donkey work. All these together take up about 12K – though this can vary depending on the machine. Take out the screen and a small area for variables and the TPA or Transient Program Area (the place in memory that the programs actually get loaded into) starts to shrink. So even with a 40K TPA running a business program may only give you 10K to play around with – not a lot at all.

What CP/M+ does is to allow the Z80 to have 128K in a banked system. This puts the screen, BIOS, BDOS, CCP and RSXs (more of these later) out of the way and leaves TPA at around 60K. This still may not sound a lot but applications programs can also use the banked memory – so you may still have around 59K to play around with for data – a much better state of affairs. DR also took the opportunity to clean up some of the dodgier bad points of CP/M 2.2 and make it work a lot more user – friendly. CP/M+ also uses RSXs more efficiently by storing them out of the way when the main program is working: what's an RSX? It's a Resident System Extension. This will expand the capabilities of CP/M in some way. It is mainly used for the GSX system which is a logical machine independent way of handling graphics.

DR also launched a number of new products at this time – CP/Net for networks, MP/M – for multi user applications, and Personal CP/M – for smaller machines without disk drives. However their drive for world dominance in the business operating system market was killed stone dead in a couple of months by the emergence of the IBM PC and it's operating system called MS-DOS – written by DR's arch rivals Microsoft (who started in a very similar way to DR, except that they were dalled The Kentucky Fried Software Company, and began by writing a program called Basic – but that's another story!). MS-DOS was written from scratch as a 'real' operating system and not as a hex monitor and it showed. It was friendly, fast (relatively) bug-free and could access 640K of memory. Business men flocked to it in droves. DR eventually recovered with a program called GEM (Graphics Environment Manager) but that's also another story!

The C128 and CP/M

Most people know that a C128 has two processors, a Z80 and an 8502. Both can have access to the 128K of main memory and both can have access to the 16K of video memory (yes, that's right – your C128 is actually a C144, but that would probably only confuse people). What most people don't realise is that the Z80 is the main processor and has priority, and that the 8502 is actually the second processor! When you turn on a C128 (with a disk drive attached) the disk whirrs. This is the CP/M boot ROM trying to load CP/M off disk. If it doesn't manage it, it gives up and grudgingly lets the 8502 have its evil way.

Remembering what I said about the minimum system configuration for CP/M I will assume that you are using a C128 with at least one disk drive and the 80 column screen facility. You can use the 40 column screen, but this is a window on a logical 80 column screen – much better to use the real thing – also as the 80 column screen has its own 16K memory, you don't loose the odd couple of K here and there.

So pop in your system disk (that with CP/M on it) grind your C128 screaming and kicking into life and hey presto! Nothing particularly exciting happens at all! In fact all you get is a version number, a copyright message, a TPA size and the letter 'A' followed by a little prompt '>'. Fantastic! Stupendous! Incredible! What happens next? Who cares?

But What does it do?

When you see the prompt, it is telling you three things. Firstly that the drive you are using is drive A. That you are logged on as user zero, and that the CCP is waiting for input from you. What do these terms mean? Well CP/M drives are designated by letters from A to P and you have a drive that all disk operations happen to unless you specify a different one. This is called the default drive. In CP/M the default drive always starts off as 'A'. In the CP/M disk system on the C128 the attached disk drive is always 'A' but it also has a 'RAM Disk' assigned to 'E' this is an area of memory that behaves just like a disk drive. This is to help you with disk copying etc. More about this later.

The user number is a way of keeping 16 different directories on the disk at once. Perhaps you will have WP files on one, Basic programs on another and a database on another one. These are called User numbers and can be from zero to 15. Like the default drive, CP/M has a default User number. This starts off as zero. If the user number is changed to get at another directory, you will still be able to get at User zero, this works like a global directory that can be accessed by all the others.

If you change the default drive then the display may look like this B>[1] – indicating drive B and if you change the User number it could look like this 4C> – indicating User four

Now the CP/M system is waiting for your input. This is very much similar to the Basic 'Ready' prompt. It means that the current operation is finished and it is waiting for a new one. From here you can type in commands to make CP/M do things.

In CP/M there are two types of command – resident and transient. Resident commands are the ones built into the system. Transient commands are loaded off disk before they are executed. It is these transient commands that take up most of the CP/M system disk.

So, What Happens Next?

The resident commands are fairly simple and are detailed as follows. You can change the default drive by typing in the new letter followed by a colon. So to change to drive 'C' you would type in 'C:'. User numbers can be changed by typing in USER n where 'n' is the new number. DIR displays a directory of disk contents sorted into alphabetical order following it with a drive letter and a colon will directory that drive. No letter and the default drive gets it. REN will rename a file. ERA will erase a named file. TYPE will display a named text file on the screen. And DIRSYS will display the system files in a similar manner to DIR. System files are files that are usually loaded in when CP/M is booted and do not normally appear in the directory. This command forces them to be displayed.

These commands also have transient versions. These are extended versions of the commands whilst due to memory space the built in commands perform only the basest function. Remember that these commands must be present on a disk in the drive for them to function.

DIR, DIRSYS commands can now have a filespec after them using the CP/M wild card system. This wild card system is identical to the Commodore one. In that a '?' stands for any letter and a '*' stands for anything else in the filename – but remember the file extension that must be specified in all CP/M operations (similar to the PRG, SEQ, USR labels on Commodore drives). So typing in DIR FRED*.* will list all files beginning with FRED, or DIR *.COM will list all command files. Including a drive letter followed by a colon before the filespec will direct CP/M's interest to that drive. Hence DIR B:*.BAK will list all backup files on drive B. You can use multiple filespecs.

You may also include an options list after the filespec. The options list is a list of commands enclosed in square brackets and separated by commas. These tell CP/M that something out of the ordinary is to be done with the directory listing. Options are as follows:

ATT – Displays user defined file attributes (don't worry about this – it's of absolutely no use what so ever!)

DATE – Displays the date and time that the file was last changed. Date stamping must have been initialised previously though.

DIR – Only displays files that have the DIR attribute.

DISK=ALL,DRIVE=ALL – (either will do) Displays fallen on all available drives.

DRIVE=(A,B,C) – Displays directory from specified drives only.

DRIVE=A – Only from drive specified.

EXCLUDE – Displays all files except the files specified.

FF – Sends a form feed before listing out the directory. Only really used for printers.

FULL– Displays masses of status information about the file as it is displayed – how long in Kilobytes, how many 128 byte records it takes up, the password protection mode and the date/time stamps.

LENGTH=x – Outputs 'x' blank lines before printing the directory, mainly used for printers again.

MESSAGE, – Give out status information as CP/M searches various drives etc. Gives you something to watch whilst it's all happening.

NOPAGE – Overides the CP/M+ paging system.

NOSORT, – Displays files in the order that they are found rather that alphabetically sorting them.

RO, Displays only files that have the read only attribute set.

RW – Displays only files with the read/write attribute set.

SIZE – Shows the length in K of the files.

SYS – Displays only system files.

USER=ALL,USER=n,USER=(0,1,2) – Similar functions to DRIVE except refer to the 16 user numbers.

Device indirection is a very clever piece of software. Say you wanted the RS232 interface to be your printer output rather than the normal printer. What you can then do is to set the printer output to the RS232 interface simple. But how do you do it?

As well as all these logical devices CP/M also has physical devices. These are:

CRT – Screen.
CRT2 – Keyboard.
LPT – Printer.
IOS – RS232.
NULL – Nothing (used for turning something off).

To alter the direction of something you simply assign it to it. In our example earlier DEVICE LST=IOS. This will set up the default printer output to go to the RS232.

Almost any device can be assigned to any other device with a few exceptions that are handled by the transient commands GET and PUT. So you could quite easily attach a terminal to the computer type in DEVICE CON:IOS. And the computer suddenly being operated by remote control. 'DEVICE CON=CRT' will change it back to normal.

You can also change options on the devices with this command. Changing the screen has been discussed earlier. But as far as the RS232 interface is concerned DEVICE AUXIN[XON,600] will set the RS232 interface input to the xon protocol and 600 baud. Various baud rates are accepted and XON/NOXON controls the handshaking. These options can be included in the same statement as the assignment and multiple assignments are also allowed. So DEVICE LST=IOS[NOXON,19200],CON=CRT is acceptable.

FORMAT – Is the transient command to format a CP/M disk prior to use. Type in 'FORMAT' and then follow instructions.

INITDIR – This command will organizes the disk directory slightly to allow date/time stamping. This says that whenever a file is written to the time and date when this happens is recorded – but remember to set the date using the DATE command or the system will use the date when CP/M was written!

SAVE – Will save a program from memory to disk – not for the unwary.

SET – This is a very powerful com

mand that lets you set a number of attributes for a file or group of files The SET command basically works in three ways The first is just setting the attributes as mentioned before 'SET *BAK[RO SYS]' will change all backup files to read only and system files This can be used with any of the RO RW SYS DIR attributes

You may have noticed the word attributes appearing above This refers to certain characteristics that can be set on a file RO and RW set the file to read only or read/write depending and will prevent the modification of a file SYS will turn a file into a system file and DIR enables directory listing These attributes will be discussed later in the SET' command which is the command used to change these

The transient versions of ERA TYPE and REN are not nearly as complex as DIR They merely allow the use of filespace rather than discrete name So ERA B * BAK will erase all backup files on drive B

USER has not transient equivalent

Now What?

Now the fun starts On your system disk you will find a good few program names Most of them are transient commands but a lot of them are better considered as discrete programs

First let us consider the quickly commands These are accessed in the same way as the resident commands by just typing them in The only difference is a slight delay before they take effect due to their being loaded off disk

DATE – Sets or displays the date and time used for date stamping of CP/M+ files when enabled (see INITDIR) To display the date use DATE or to have a continuous display of date and time use 'DATE CONTINUOUS' or 'DATE C' to set the date use 'DATE SET'

DUMP – Displays a hex dump of a named file

GET – Gets console input from a disk file rather than from the keyboard Rather like the BBC micro's EXEC' command

PUT – Writes everything that would have gone to the screen into a disk file instead Rather like 'SPOOL' on a BBC micro

DEVICE – This command allows you to set or change physical and logical devices around and set the characteristics for those devices Device names are three letters long with a trailing colon They may also have the suffix 'IN' or 'OUT' to change only that characteristic

CON (CONIN, CONOUT) – is the console

DEVICE CON[COLUMNS=40, LINES=14] – will set the size of the screen

DEVICE CON[PAGE] – will display the current size

AUX (AUXIN,AUXOUT) – is the auxiliary in/out usually attached to the RS232 interface

LST: – is the printer output name It has no options

The second function changes the drive attribute and name The drive attribute is either RW or RO in normal operation it is RW SET A [RO] will stop you writing to that drive In addition each disk can have a name conforming to the same rules as CP/M file names (i e eight letters a dot and three letters) SET A [NAME= GAMES.001] will label the disk with that name

The last function is used with the passwords system that CP/M+ uses Firstly you can assign a password to the entire disk This will prevent anyone using the SET command on that disk at all It takes the form 'SET [PASSWORD=melon]' where 'melon' is the password To remove the password 'SET [PASSWORD=' is needed Note that you need the password to get that far and that you don't need the trailing bracket – Return will do

To enable password protection on the files on a disk the password system must first be initialised SET [PROTECT=ON]' will alter this

To change or set the passwords the command takes on the syntax SET FRED* * [PASSWORD=mike] where mike is the password and FRED* * refers to any normal filespec

Passwords can also be selectively used on certain functions these are READ WRITE DELETE NONE One of these functions can be selected READ affects everything so that you need a password for almost every access of the file

WRITE needs a password for writing renaming, or deleting This allows the file to be read but not tampered with

DELETE allows you to do anything to the file except delete it or rename it NONE turns off the password protection The syntax is 'SET WP COM [PROTECT=READ]

Default passwords can also be selected Say all the files on the disk had the password 'fred' SET [DEFAULT=fred] would remove the need to type in the password every time a file was accessed Normally the password has to be included in the filespec after a trailing semi-colon Say a file called 'private doc' with a password of 'mike' was to be accessed, then the filespec would be 'private doc;mike

The final function of the SET command is to alter the way that date stamping is used (assuming that date stamping has be initialised) The three options ACCESS, UPDATE and CREATE are used Access will stamp the file every time that you do anything with it create only stamps it the first time you write it to disk and update everytime that you alter the file Create and Access are mutually exclusive and turning one on will turn the other one off Syntax is SET [UPDATE=ON]

SHOW will display certain information about the disk depending on the option list given SHOW on its own or with a drive name will give you the read/write space remaining SHOW with an option after it will perform one of the following functions

LABEL – Will show the disk name whether the disk is passord protected the stamp create/update status, and the date that the disk name was created or updated

USERS – Will list the active user numbers and their respective number of active files and free directory entries

DIR – Displays the number of free directory entries

DRIVE – Will output a comprehensive list of the characteristics of that drive

So typing in SHOW A [DIR] will give you the number of free directory entries on drive A

I think that wraps it up for this month Next month I will be telling you about once or two special modifications made to the C128 version of CP/M like the virtual drive and the user defined keyboard Also I will be detailing some of the really complicated commands as well as explaining some of the more obscure concepts that CP/M uses So if you are confused (I know I am!) all will be revealed next month YC

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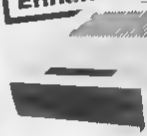

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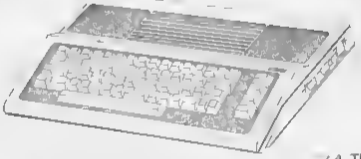

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By Les Allan

DISKIT 1

Memory Saver is a useful routine aimed at saving all your machine's memory from $0801 to $FFFF. It is not intended to promote piracy which may be the immediate conclusion which you leap to because unlike commercial *Freeze Frames* to name but one the user can only work with material which is under his control. Without the knowledge of a start address it is of no use to you whatsoever.

The Facts

Two machine code routines are located at $0247 and $033C which provide the means to save memory between $0801 and $FFFF. The program saves three files as follows:

1. Main part – from $0801 to $CFFF
2. Kernal – from $D000 - $CFFF

In order to make use of the kernal routines for saving etc. this part is relocated to $1000 and then saved between $1000 - $3FFF.

3. Boot part – from $0801 - $3FFF

This part contains the character and kernal RAM which is saved between $1000 - $3FFF. Two m/c routines are included to perform the following:

(i) relocates the character/kernal ram to $D000 - $FFFF
(ii) loads in the MAIN file and then runs it.

OK, so how do you go about using it?

Point number one is that you must know the start address of the program or you're lost before you start.

Instructions

1. Load in the program to convert into two parts.
2. Press re-set switch if required (Quickdisk preferred).
3. Load 'MEM1', 8,1
4. Load 'MEM2', 8,1
5. Type in Basic SYS call i.e. 10 SYS2061 (if that's the start address of course). A JMP$ command can be used to replace the RUN command in the BOOT file but you will need to use a m/c monitor or disk monitor to do this.
6. SYS 828 to save memory.
7. The two files BOOT and MAIN are now a complete working copy which can be individually crunched to save working space.
8. If when the MAIN part is crunched, it crunches to less than 154 blocks then the KERN part $1000 can be appended to this.

Remember that it is illegal to pirate software so this routine is for use with your own software!

The program as listed must be typed in exactly as written and saved prior to running. Error trap routines are included to ensure that the data as read is correct. The program when run stores the relevant code at a temporary address of $8000 and when prompted relocates the working programs to Basic, warm start area and the cassette buffer and saves the programs to disk.

DISKIT 2

When programs are saved to disk very often there is a considerable duplication of adjacent data in memory which can be compressed by the use of a code compressor.

This Turbo Cruncher will work with either Basic or machine code programs providing that the program resides in memory from between $0801 and $D000.

The utility provides the user with the facility to view the directory with the F1 key or go straight to the cruncher with the F7 key. The program is then read in at turbo rate, common code compressed and re-saved back to disk at turbo rate prefixed with a '+'.

The skill of the user will determine the results that are available but it is possible to fill memory with common code $EA for example, load in the machine code to memory and finally add a Basic boot to provide a single file that may exist between $0801 and $D000. The finished file can then be Turbo Crunched to produce a smaller working version which could be as small as 17 blocks which, considering the saved file was 202 blocks, represents a considerable saving of disk space.

Remember that it is illegal to pirate software so make sure that you only do this to your own programs!

The program must be typed in exactly as written and saved prior to running. Error trap routines are included to ensure that the data as read is correct. The program when run stores the relevant code at a temporary address of $8000 and when prompted relocates the working program to Basic ($0801) and saves the program to disk.

DISKIT 3

This machine code program resides in the cassette buffer at $033C and enables a program to be made into one part from the files called '+MAIN' and 'KERN'.

The program works by taking the results from the MEMORY SAVER routine which creates three files 'MAIN', 'KERN' and BOOT. If when the MAIN file is Turbo Crunched the total length of the file

less than 154 blocks (i.e. 153 blocks max) then sufficient room exists from $A000 — $D000 in which to fit the KERN part of the program

It is most important because of the way in which this routine is written to use the Turbo Cruncher cruncher that is characterised by a two tone grey flashing border and a sys call of 0 SYS 2061

Instructions

1 Convert program into three parts MAIN KERN' and BOOT using MEMORY SAVER

2 Turbo Crunch the file MAIN' and IF the resulting file +MAIN is less than 154 blocks THEN this routine can be continued ELSE crunch the BOOT file to provide a low memory useage of the program one part maker can not be used with this program

3 The files to be used must be resident on disk with at least 202 blocks free and called '+MAIN and KERN'

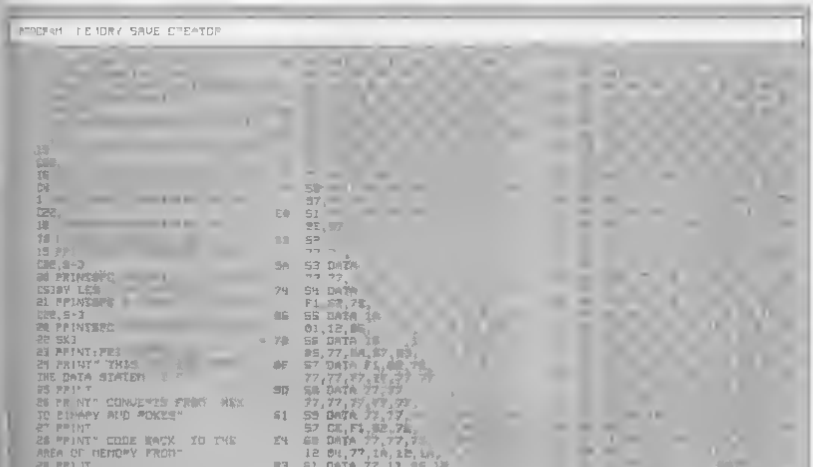
4 Load MEM3',8,1 to load m/c routine

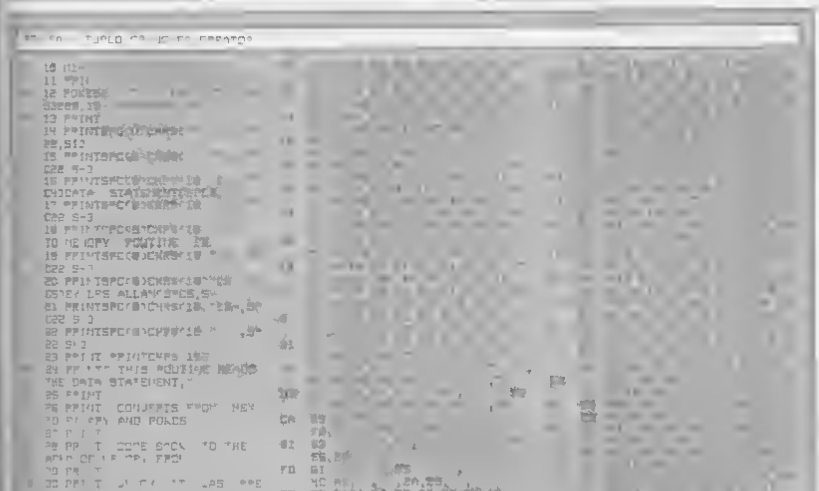
5 SYS 828 to start transfer process which loads '+MAIN' relocates the 'KERN' to $A000 transfer kernal relocation program to $9FDO and saves the final ONE PART' file

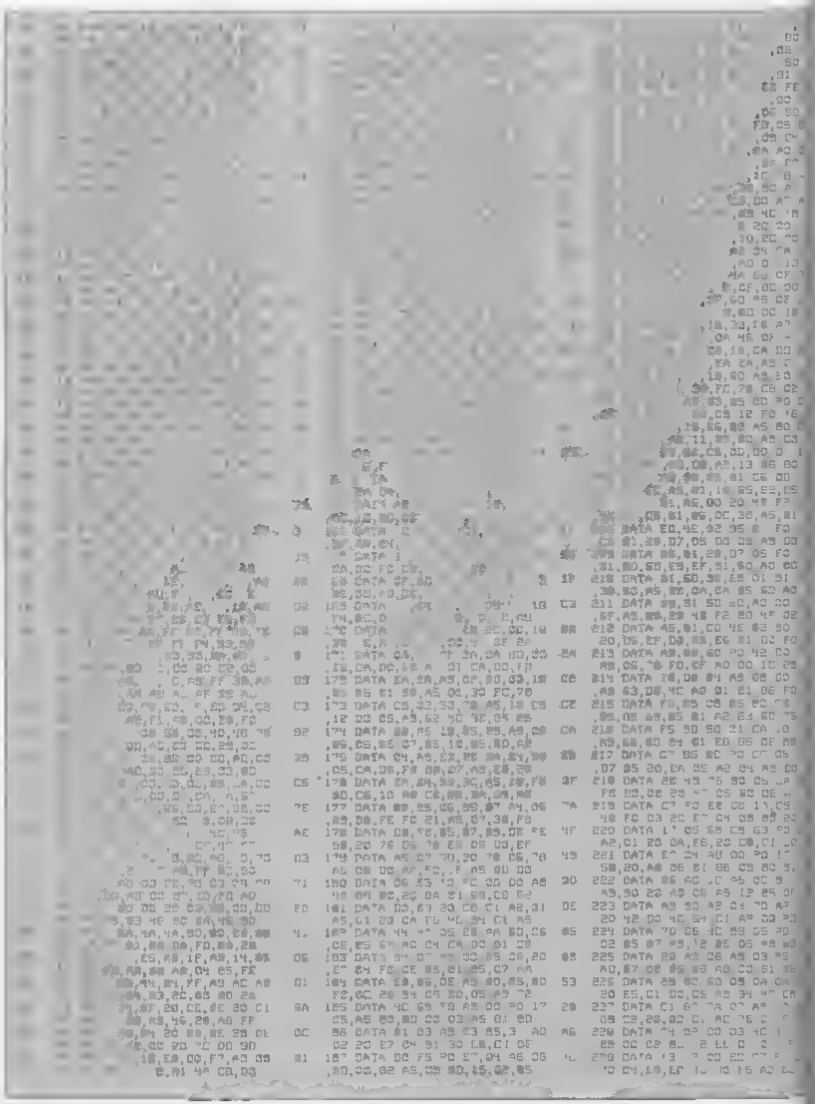
6 Turbo Cruncher the ONE PART file to further reduce disk space

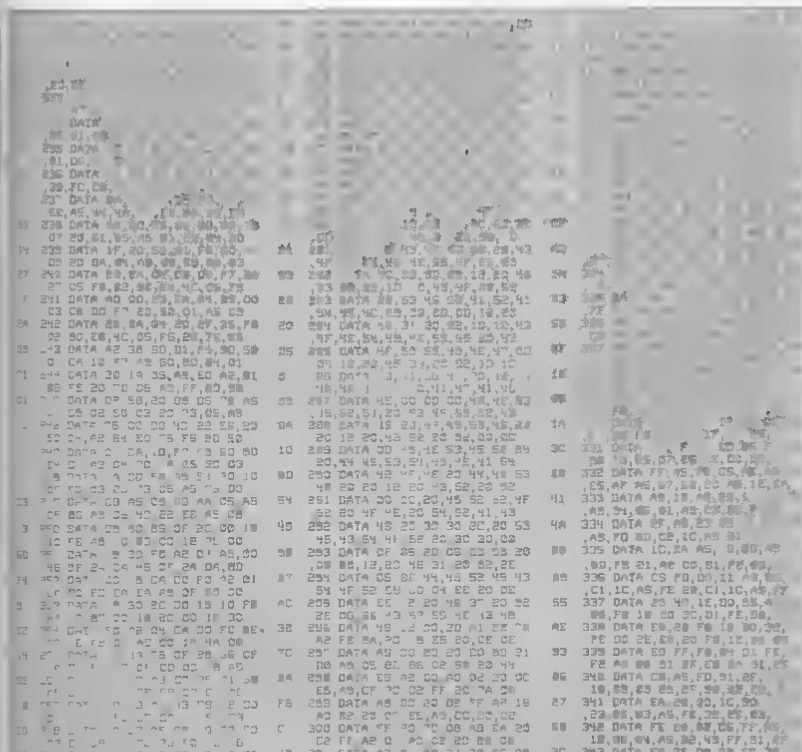
Remember that it is illegal to pirate software so make sure that you only do this to your own programs!

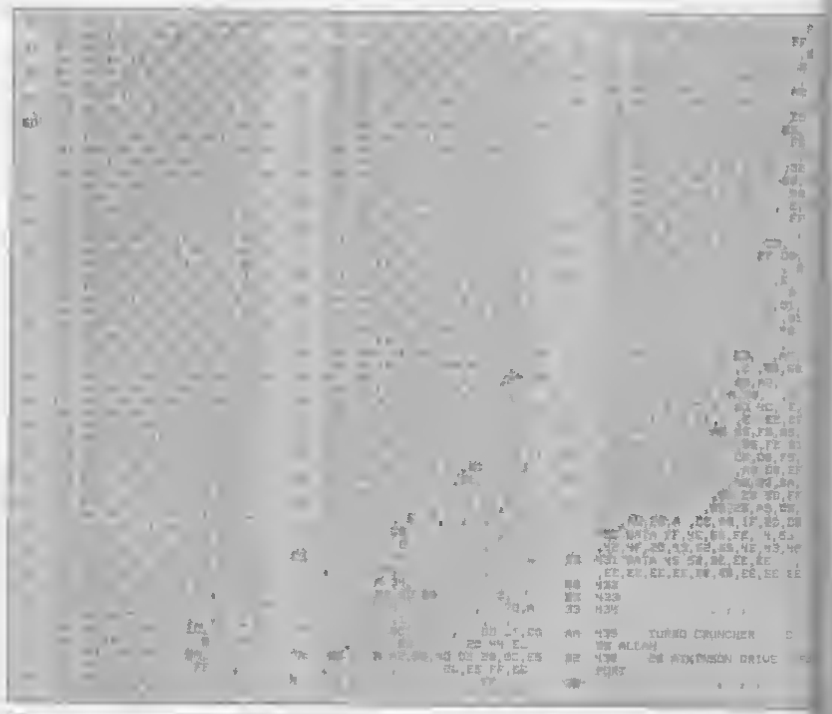
The program as listed must be typed in exactly as written and saved prior to running Error trap routines are included to ensure that the data as read is correct The program when run stores the relevant code at a temporary address of $800 and when prompted relocates the working program to Basic ($0801) and saves the program to disk



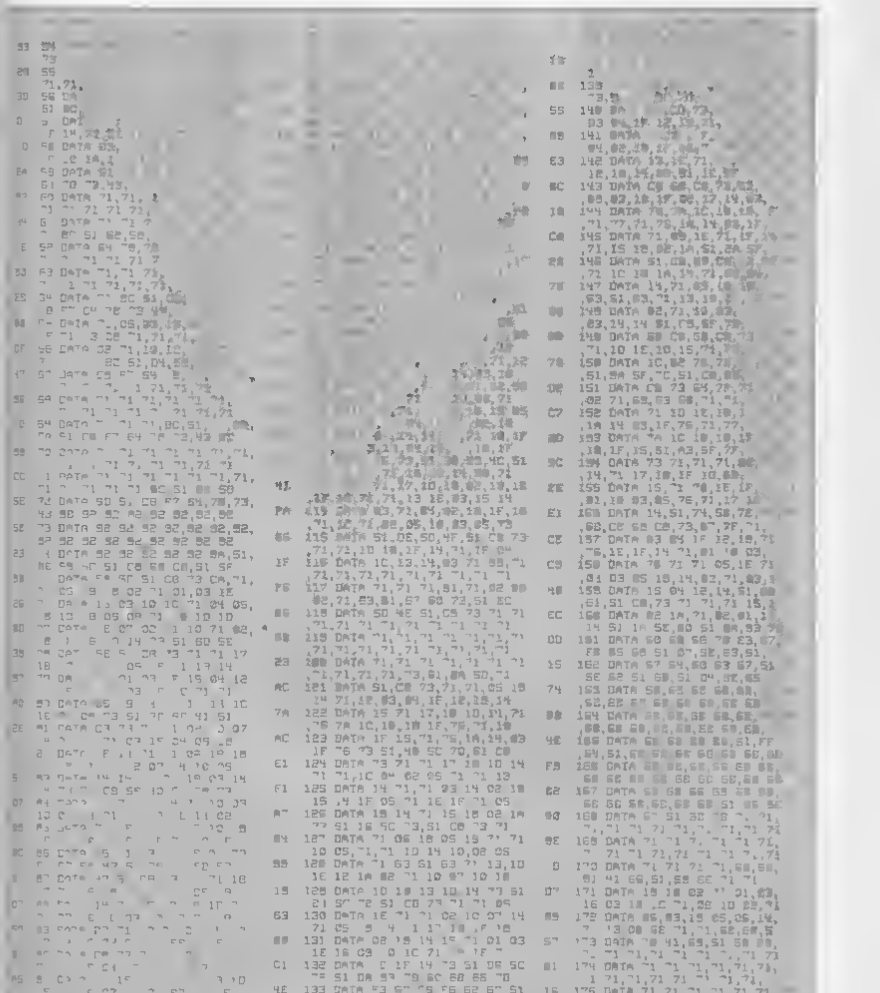







TURBO CRUNCHER
ALLAN
DR ATKINSON DRIVE


PROGRA OFF PART LOADER
SAVE
DATUM



Nursery Rhyme Land

Adventure games are a useful asset to education via a computer. Here we bring you the graphics for our own educational game

By Margaret and Allen Webb

There's nothing that enhances an adventure game so much as some eye-catching graphics, providing that available memory allows for this indulgence.

Our Nursery Rhyme Land game is aimed at the very young and so the graphics have additional importance in keeping the interest going and also aiding recognition of locations.

In the February issue of *Your Commodore*, we brought you the loaders for the text part of this game. This month – in the final part – we are providing the graphics driver.

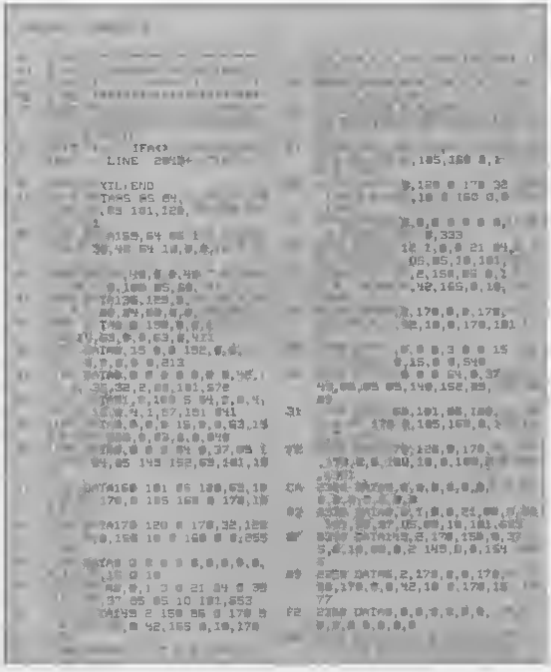
Getting in the picture

The method of creating a binary file is as follows:

1 Turn on or cold reset your 64.
2 Enter this line in direct mode:

POKE 44,80: POKE 80*256,0: NEW

3 Load and run Listings 3, 4 and 5 (in that order).
4 Load and Run Listing 2. Save the block starting at 8192 and finishing at 17176. Listing 1 (*YC Feb 87*) assumes that the file is called PICTURE BLOCK.
5 If you have already tried the textual part of the adventure on its own, don't forget to reset line 40 of the adventure booter to that given in Listing 1 (*YC Feb 87*). YC



```
C5 3
   1                    ,224,0
                        224,
B8 3380                 ,0,191,208
   0 131,                 ,0 169 84,0,1
   30 169
D4 3390 DATA00,0 169 88 0 2 84 0
   2 84,0,0,0,0,0 191 238
44 3400 DATA127,255 248 127 255
   248 127,255,248,05 85 66 85,8
   5 85,85,2443
6C 3410 DATA85,66 85 85 88 85 85
   25,85 85,88 85 84 74 85 85 1
   208
47 3420 DATA88,85 81 25 85 85,10
   5 85,81 125,85,85 106 85 81 1
   05,1381
1F 3430 DATA85,81,42 85 85 170 0
   5 84 170 85 68 170 85 85 170
   255 1785
4D 3440 DATA15 221 255 13 83 127
   4 115 71 149 85 20 149 85 85
   148 1505
82 3450 DATA85 85 161 85 85 161
   21 85 165 85 85 164 85 85 165
   ,85 1687
EF 3460 DATA85 165 21 85 169 85
   85 168 69 85 165 85 85 165 21
   85 1831
   3470 DATA165 81 85 170 17 85
   170 5 85 170 68 85 170 84 85
   170 1708
F8 3480 DATA0 0 0 168 0 0 170 12
   0 0 1 0 170 0 170 170 0 170 1
   308
   3490 DATA170,0,170 170 0 170
   234 3 171 234,3 171 234 3 171
   234 2138
   3500 DATA0 171 234 3 168 234
   3 171 233 85 171 228 85 171 2
   13 85 2258
   3510 DATA171 85 85 165 85 85
   165 85 85 148 85 85 85 85 85
   255 1844
   3520 DATA0 0 0 0 0 10 0 2 170
   0 170 170,0 170 170 0 062
   3530 DATA170 170 0 170 170 15
   2 171 170 150 171 234 152 171
   234 152 171 2170
   3540 DATA234 152 171 234 152
   171 42 85 187 234 85 91 234 8
   5 0  234 2478
   3550 DATA85 85 234 85 85 106,
   85 85 80 85 85 86 85 85 15
   1 1842
   3560 DATA0 0 0 164 0 0 170 12
   0 0 170 170 0 170 170 0 170,1
   308
   3570 DATA170 0 170 170 15 170
   170 13 170 170 15 170 170 13
   170 42 1758
   3580 DATA15 168 42 0 162 42,0
   135 41 85 130 255 255 135,2
   5 275 1890
   3590 DATA 43 255 252 ,81 255,
   244 151 255 249 133 85 21,84,
   85 21 255,2685
   3600 DATA0 0 0 0 0 18 0 2 170
   5 170 1 0 0 170 170 0 062
   3610 DATA170 170 252 170 170,
   220 171 170 252 171 234 228,3
   71 234 252 171 3170
   3620 DATA2?1 0 ?? 234 0 171,
   42 85 127 234 85 81 231 85,87
   234 2054
93 3630 DATA85 85 234 95 85 106,
   85 85 80 85 85 85 85 85,85 10
   3 1534
11 3640 DATA0,0 0 168 0 0 170,
   0,0 170,170,0 170,170,0,1
```

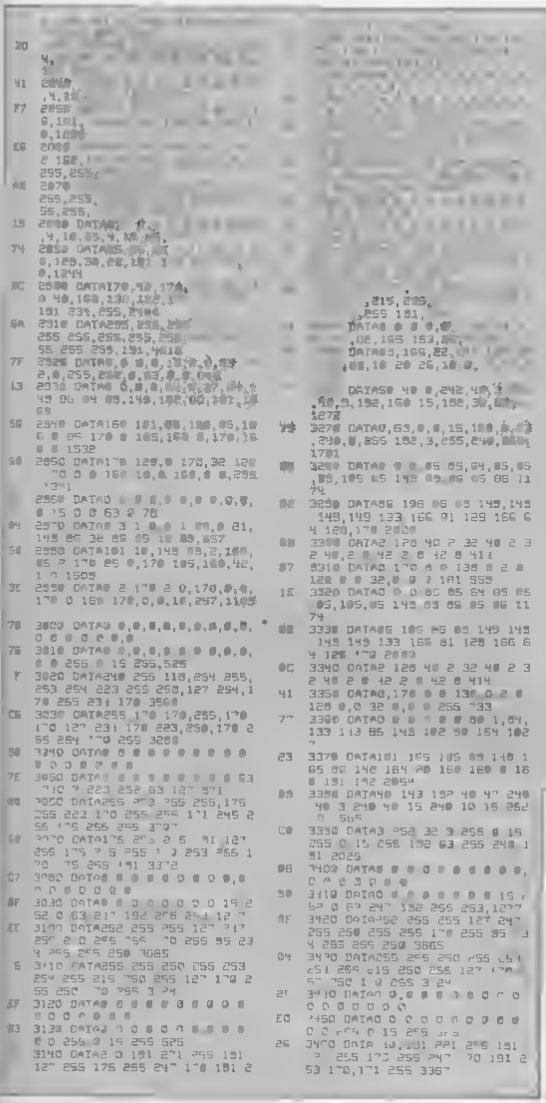
```
                    ,0,170,
                    70,0,171
                    ,234,
                    171,2
68                  ,05,
                    15,85
                    252
                    ,2,170
                    ,0,1
                    ,062
A8                  170,0
                    170,0,170 0
                    170,
97                  170,0,170
                    170,
                    170,85 0
                    0 170,1
F4                  ,106
                    85 85,
                    1 1575
81                  170 12
                    0,0 170,
                    300
6B 3730 DATA170,0 170 170 0,1
   234 0,171 234 0 171 234,0,1
   234 2123
8F 3740 DATA0 171 234 0 102,
   0 171 233 85 171,228,85,171,
   13 85 2250
D8 3750 DATA171 85 85 165,85 85,
   165 85 85 149 85 85,85 85,85,
   255 1941
50 3760 DATA0 0 0 0 10 0 2,1
   0 170 170 0 170 170,0 062
8A 3770 DATA170 170 0 170 170 0
   170 170,0 170 170 0 170,170,
   30 1875
85 3780 DATA170 213 85 170 157,
   5 170 221 85 106 215 218 234
   95 214 231 2703
18 3790 DATA85 213 234 55,213,
   4 85 85 50 85 85 80 85 85
   184 2018
95 3800 DATA0 0,0 0 0,0 0 0,0
   0,0,0,0,0,0
```

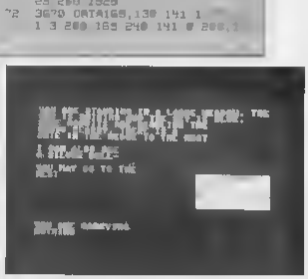
PROGRAM: LISTING 2

```
1 REM*********************
2 REM*      LISTING 2      *"
3 REM* BINARY FILE SAVER *"
4 REM*********************
10 INPUT"START ADDRESS",SA
20 INPUT "END ADDRESS",FA
30 INPUT "DEVICE",DE
40 INPUT "FILE NAME",FI$
50 POKE194,SA/256 POKE193,SA-PEEK(194)*256
60 POKE175,FA/256 POKE174,FA-PEEK(175)*256
70 L=LEN(FI$)
80 FORI=1TOL POKE1023+I,ASC(MID$(FI$,I,1))
 NEXT
90 POKE 187,0 POKE188,4 POKE183,L POKE186,
DE SYS62954
```

```
3120 DATA0,0,0,
```

```
10 REM ********************
20 REM *  LOADER 2  *
30 REM ********************
40 REM ********************
95 2000 FOR L=8TO[illegible]
D15 PERDA CX=[illegible]
*16+D A NEXTD
98 2010 READA IFA[illegible]
ERROR IN LINE'[illegible]
F
99 2020 NEXTL END
100 2030 DATA255,255,[illegible] 81,200
254 111,171 250,91,150 229 10
1,101,213,101,2867
110 2040 DATA101,213,85 105 89 88
,105,89 88 89,89,89,89 85 05
[illegible],1576
120 2050 DATA85 85 88 148 34 34 3
4,136,136 136,34,34 34,136 13
[illegible],1426
130 2060 DATA34 34 34,140 136 184
 62 34 242 255 283 252 0 0 0
255 1666
140 2080 DATA255 255 255 255 170
171,254 86 150,249,85 101 105
101 106 182 2868
150 2090 DATA149 85 121 150 85 10
1 150 153 68 88 149,1 162 167
,1 184 1725
160 2100 DATA35 1 96 38 33 86 43
136 86 43 34 88 43 136 168,16
3 1664
170 2110 DATA34 34,35 136 135 136
,34 34 34 136 136 136 34 34 3
4 255 1378
180 2120 DATA255 255 255 253 12
255,182 106 255 88 85 191 149
,1,174 148 2 80
190 2130 DATA1 189 148 0 83 148 0
,83,194,1 93 144 1 85 84 1 11
45
200 2140 DATA101, 100 1 101 100 1
85,88 137 86 82 34 21 136 136
,137,1339
210 2150 DATA34 34 34 136 135,136
,34 34 34 136 136 136 34 34 3
4 255 1377
220 2160 DATA255 255 255 253 127
255 102 106 255 84 85 191 149
,1 174 148 2788
230 2170 DATA1 189 148 0 83 148 0
,83 194 1 93 144 1 85 84 1 11
45
240 2180 DATA101 100 1 101 100 1
85,88 137 86 82 34 21 136 136
,137 1339
250 2190 DATA34 34 34 136 136 136
,34,34 34,136 136 136 34 34 3
4,183 1385
260 2200 DATA255 255 255 254 170
255 150 149 191 85 85 111 169
,88,110 85 2652
270 2210 DATA85 150 85 150 108 10
1 150 85 86 37 81 218 38 64 2
18 41 1710
280 2220 DATA64 216 0 64 232 0 72
 232,0,34 232 137 136 202 42
34,1724
290 2230 DATA200 136 136 34 34 34
,136 136 136 34 34 34 136 136
,255,255 1747
300 2240 DATA255 255 255 255 170
171,254 86 150,249 85 101 105
101,108 182 2868
310 2250 DATA149 85 121 150 85 10
1 150,153 68 88 149 1 152 167
,184,1725
320 2260 DATA35 1 96 38 33 86 43
136,86,43,34 88 43 136 168 16
3 1664
330 2270 DATA34,34,35 136,136,136
,34 34 34 136 136 136 34 34 3
4 255 1378
340 2280 DATA255 255 255 253 12
255,182 106 255 88 85 191 149
,1,174 148 2 80
350 2290 DATA1 189 148 0 83 148 0
,83,194,1 93 144 1 85 84 1 11
45
360 2300 DATA101 100 1 101 100 1
85 88 137,86 82,34 21 136 136
,137 1339
370 2310 DATA34 34 34,136 136,136
,34 34,34,136 136 136 34 34 3
4,255 1377
380 2320 DATA255 255 255 181 238,
254 111 171 250 81 150 229 10
1 101 213 101,2867
390 2330 DATA101 213 85 105 89 88
,105 89 88,89,89 89 89 85 85
[illegible] 1576
400 2340 DATA85,85 88 148 34 34 3
4,136 136 136 34,34,34 136 13
6 136 1426
410 2350 DATA34 34 34 140 136 184
 62 34 242 255 283 252 0 0 0
182 1793
420 2360 DATA255 255 255 253 127
255 182 106 255 85 85 191 149
,1 174 148 2788
430 2370 DATA1 189 148 0 83 148,0
 83 194 1 93 144 1 85 84 1 11
45
440 2380 DATA101 100,1 101 100 1,
85 88 137 86 82 34 21 136 136
,137 1339
450 2390 DATA34 34 34 136 136 136
,34 34 34 136 136 136 34 34 3
4 255 1377
460 2400 DATA255 255 255 234 170
255 150 149 191 85 85 111 169
 88 110 85 2652
470 2410 DATA85 150 85 150 108 10
2 150 85 86 37 81 218 38 64 2
18 41 1710
480 2420 DATA64 216 0 64 232 0 72
 232 0 34 232 137 136 202 42
34 1724
490 2430 DATA200 136 136 34 34 34
,136 136 136 34 34 34 136 136
,136 1 1 1683
500 2440 DATA255 255 255 234 170
255 150 149 191 85 85 111 169
 88 10 85 2652
510 2450 DATA85 150 85 150 108 10
2 150 85 86 37 81 218 38 64 2
18 41 1710
520 2460 DATA64 216 0 64 232 0 72
 232 0 34 232 137 136 202 42
34 1724
530 2470 DATA200 136 136 34 34 34
,136 136 136 34 34 34 136 136
,136 255 174
540 2480 DATA255 255 255 181 239
254 111 171 250 91 150 229 10
1 101 213 101 2867
550 2490 DATA101 213 85 105 89 88
,105 89 88 89 89 89 89 85 85
85 1576
560 2500 DATA85 85 88 148 34 34 3
4 136 136 136 34 34 34 136 13
6 136 1426
570 2510 DATA34 34 34 140 136 184
 62 34 242 255 283 252 0 0 0
178 1790
580 2520 DATA255 255 255 253 127
255 182 106 255 88 85 191 149
,1 174 148 2788
590 2530 DATA1 189 148 0 83 148 0
 83 194 1 93 144 1 85 84 1,1
45
600 2540 DATA101,188,1,101,100,1,
,85 88 34 21 136 136
34 34 34 136 136 136
34,136 136 136 34 34 3
4
610 2550 DATA255,255 255 234 170
255,150,149 191 85 85 111 169
 85,110,85,2652
620 2560 DATA85,150 85 150 105 10
2 150,85,86 37 81,218,38 64 2
18 41 1710
630 2570 DATA64 216 0 64 232 0 72
 232,0,34 232 137 136 202 42
34,1724
640 2580 DATA200,136 136 34 34 34
,136 136 136 34,34 34 136 13
,136 151,1683
650 2590 DATA255,255 255 255 235,
255 254 150 169 248 85 85 229
 86 81 213 3111
660 2600 DATA193,88,213 153 64 21
7 153 64 89 149 64 89 150 64,
89 150 1511
670 2610 DATA64 89 150,64,85 88
2 101 101 34,101 101 136 101
101 34 1428
680 2620 DATA183 100 136 151 86
4 151 84 136 153 82 34 127 21
6 136 255 1558
690 2630 DATA255 255 255 254 151
255 213 171 255 85 81 253 22
85 245 5 2835
700 2640 DATA149 181 5 153 117 1,
153 117 1 153 85 1 153 84 1
3 448
710 2650 DATA88 1 83 53 137 83 1
53 34 89 153 136 88 153 34 85
149 1637
720 2660 DATA136 53 45 34 2, 149
136 149 149 34 21 149 136 19
4 85 183 1705
730 2670 DATA0 0 0 0 0 0 0 0 0 0,
0 0 0 0 0 0 0 2
740 2680 DATA0 0 0 0 48 72 80 1
170 85 106 181 85 175 165 8
2 8
750 2690 DATA3 117 105 83 3
67 83 170 117 85 106 85 85
88 85 1687
760 2700 DATA85 53 85 83 83 85
1 0 85 85 85 85 85 85 85 2
1688
770 2710 DATA0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 32 32
780 2720 DATA0 0 68 0 168 42 02
168,165 85 168 53 86 192 117,
21 1440
790 2730 DATA212 1 0 81 1 222
3 68 85 84 85 84 85 59 85 85,
85 1735
800 2740 DATA81 0 17 80 0 85 8
8 85 85 85 85 85 85 85 85 151,
1251
810 2750 DATA0 0 0 80 0 0 70 1
8 0 170 170 0 170 0 0 170
303
820 2760 DATA1 0 0 170 170 0 170,
234 0 171 234 0 171 234 0 17
234 2 98
830 2770 DATA0 171 234 0 168 234
0 171 233 85 171 255 85 171
13 85 2850
840 2780 DATA171 85 85 170 85 85
155 85 85 149 85 85 85 85 85
255 1844
850 2790 DATA0 0 0 0 0 10 0 2 1
0 170 170 0 170 170 0 862
860 2800 DATA170 170 0 170 170 0
170 170 0 170 170 0 170 170
5,58,1875
870 2810 DATA170,213,85,170,197
```





Popper

On a light-hearted note, we bring you a game featuring Popper the green pea. Have fun!

By Ian Potts

As Popper the popping pea you must explore the sixty four rooms of each of the Green Giant's castles in search of the Popper juniors that he has kidnapped.

Each castle has eight floors each eight rooms wide and on each floor you will find a junior Popper. When you have found all eight Poppers in each castle you must put them back into their pod.

However life is not all that easy because the Green Giant has sent many baddies to hinder your progress.

To get from one floor of the castle to another you must pop through a hole in the floor but make sure that you have found the Popper junior on that floor because there is no way back up again. Beware of multiple holes positioned beneath each other because you will be unable to find all the Popper juniors and put them in their pod.

When you get all the Poppers in the pod go on to the next castle to rescue even more poppers from the clutches of the Green Giant.

Controls for Play

To move Popper about the castle use a joystick in port 2. Press fire to start a game and push left and right to guide Popper.

To load Popper, press Shift and Run/Stop and press PLAY on the tape deck. The game will load and run automatically.

Note

To type in the game please use the *Your Commodore* Hex Data Entry Program. Check the Contents page to find out exactly where it is in this issue.

```
PROGRAM  POPPER
USE HEX DATA ENTRY TO TYPE THIS IN

0001 22 00 0A 00 D0 41 02 30  EB   0BC1 20 EF 09 59 CE 55 0E A9  07
0009 A7 41 82 31 3A 93 22 59  0D   0BC9 00 0D 51 0E A5 02 D0 4F  B9
0011 4F 50 20 47 52 41 59 40  00   0BD1 0E AD 10 D0 25 01 D0 15  D3
0019 49 43 53 22 2C 31 2C 31  25   0BD9 AD 00 D0 C9 82 D0 02 A5  A0
0021 00 2C 85 14 00 8E 32 31  7A   0BE1 00 8D 4F 0E EE 55 0E EE  35
0029 30 30 01 00 00 00 00 00  00   0BE9 57 8E 20 28 12 58 A2 00  6F
0031 00 00 00 A5 46 8D 18 03  40   0BF1 20 F8 85 E0 E8 E8 0A D0  4F
0039 A9 00 8D 19 03 A5 00 20  39   0BF9 F7 60 8D 00 D0 30 E5 01  A0
0041 D2 FF 20 81 19 20 4E 18  D3   0C01 5D 00 D0 50 91 60 AD 10  CD
0049 A5 0E 8D 11 D0 20 3D 0A  8D   0C09 D0 5D 33 0A 8D 10 D0 60  24
0051 24 8F 00 A9 01 0D 36 20  12   0C11 A2 00 20 1D 0A E0 E8 E0  00
0059 A5 00 8D 67 15 8D 66 15  A1   0C19 0A D0 F7 60 8D 00 D0 10  48
0061 AD 1E D0 20 20 12 A2 00  EA   0C21 59 01 5D 00 D0 E0 01 60  55
0069 A9 00 00 D0 FD CA D0 FA  0D   0C29 AD 10 D0 5D 33 0A 8D 10  6F
0071 A5 00 8D 56 20 A5 1E 8D  D3   0C31 D0 60 01 81 02 82 84 84  19
0079 11 D0 A2 84 A0 00 06 D0  77   0C39 00 00 10 16 AD 00 DD 25  74
0081 FD CA D0 FA AD 77 22 F8  82   0C41 FC 85 02 8D 00 DD A5 82  65
0089 1F A5 01 0D 0A 19 28 56  0D   0C49 8D 10 D0 A5 00 8D 20 D0  C7
0091 10 20 00 15 20 00 15 20  18   0C51 A5 00 0D 21 D0 A5 1F 8D  65
0099 00 15 20 00 15 20 00 15  CF   0C59 15 D0 A9 0F 8D 1C D0 A9  A5
00A1 AD 0A 15 D0 F8 4C 3E 1F  45   0C61 01 8D 25 D0 A9 00 8D 26  B2
00A9 AD 0A 15 F8 18 A9 00 8D  19   0C69 D0 A9 05 8D 27 D0 8D 20  00
00B1 0A 15 20 00 15 A5 01 0D  9E   0C71 D0 0D 29 D0 0D 2A D0 A9  CA
00B9 0A 19 20 00 10 20 C0 10  6D   0C79 00 0D 28 D0 8D 10 D0 A5  BC
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0129 0E D0 53 4C D2 45 AD 54  AA   0CE9 41 8D EE 46 9D EE 42 E8  38
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0C31 C9 0A D0 08 A9 0E 8D 4E  95
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0C41 0E D0 0D A9 0F 8D 4E 0E  E4
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0E69 C9 04 D0 03 4C A5 0F AD  E0
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1019 00 01 00 00 00 00 02 00  1A
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1031 00 02 02 06 03 01 05 03  A2
1039 04 00 03 09 03 04 01 05  B7
1041 02 05 01 06 05 02 03 00  A1
1049 02 04 03 02 04 02 05 06  D6
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08FE 00 00 00 00 00 00 00 00  00
08FF 00 00 00 00 00 00 00 00  00
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```
PROGRAM FOR GRAPHICS
USE HEX DATA ENTRY TO ENTER THIS PROGRAM
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4920 03 81 FF C0 E0 F8 FF FF 30   4D20 1F 07 03 03 01 C1 83 07 02   4D70 FF 3F 1F 1F 1F 1F 3F 7F CC
4930 C1 C1 81 81 81 23 FF FF 6A   4D30 F0 E0 C0 C0 00 C0 FF FF 15   4D70 00 00 00 00 00 00 00 00 78
4940 C3 81 01 01 01 01 00 00 07   4D40 1F 7F 03 01 01 03 FF FF 2A   4D80 00 00 00 00 00 00 00 00 00
4950 C3 81 01 01 81 01 01 01 4E   4D50 F0 E0 C0 C0 01 C3 FF FE :F8   4D90 00 00 00 00 00 00 00 00 00
4960 81 01 01 01 01 C3 FF FF 82   4D60 1F 07 03 03 01 C1 83 07 :22   4D80 00 00 00 00 00 00 00 00 58
4970 81 01 01 01 81 C3 FF FF 8A   4D70 FE C7 01 00 C0 F8 FF FF 78   4D90 00 00 00 00 00 00 00 00 55
4980 C0 00 00 C0 F0 F0 F8 F8 :F0   4D80 03 01 01 01 03 0F FF FF FE   4D80 00 00 00 00 00 00 00 00 AA
4990 03 81 01 03 1F 1F 1F 1F C2   4D90 FE FC F0 F0 E0 C1 C3 83 11   4D90 00 00 00 00 00 00 00 00 AB
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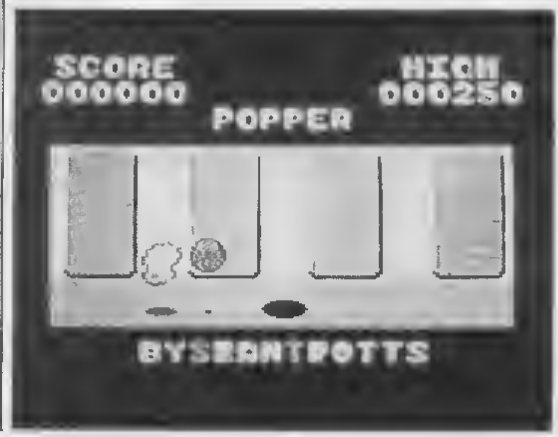

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50D0 00 3A AA 00 3E AA 00 0F 0C  5100 C5 00 FF D5 50 E0 A0 44 30  5170 3E AA 5A 3A AA AA 3A AA AC
50E0 E3 00 03 FF 00 00 3C 00 0C  5110 AA AC 00 A6 0C 00 55 00 71  5180 3A 3A AA AA 3A AA AA 00
50F0 AA AA AC AA AA AC AA AA FA  5120 10 05 0C 00 35 AC 00 55 07  5190 F0 00 00 FF 00 00 AF C0 F5
5100 AC EA AA AC EA AA 0C EA :30  5130 6C 00 A5 6C 00 A5 0C 00 05  5140 02 AA F0 00 AA 3C 00 AA 76
5110 AA 30 AA AA 00 AA AA F0 52  5150 A5 00 00 AA 30 00 AA F0 F7  5150 AC 00 AA AF 00 AA A0 00 5F
5120 AA A0 C0 AA A0 00 AA A0 55  5160 00 A0 C0 00 AE 00 00 00 A5  5160 A3 A1 C0 A5 6A C0 A5 6A 50
5130 00 AA A0 AF 00 00 AA 31  5170 00 03 AA 00 03 AA 00 03 E7  5170 A6 AA 3C AA AA AC AA AA 56
5140 AC 00 AA 3C 00 AA 00 00 0E  5180 AA 00 0F AA 00 0E 0E 00 CD  5180 6A 3E 5D AA 00 55 AA 00 C5
5150 A6 F0 00 3F C0 00 FC 00 5B  5190 0E 3E 00 0E 0E 00 0F AA 01  5190 A6 AA 3C AA AA AC AA AA 56
5160 00 C0 00 00 00 00 AA 00 30  5100 00 03 AA AC 03 E8 00 00 60  5100 AC AA AA AC AA AA AC 00 20
5170 00 00 30 00 00 0F 00 00 9A  5110 FF 00 00 3C 00 00 00 00 CF  5110 AA 3A AA AA 3A AA AA 20
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5190 03 AA 00 0F AA 00 0E AA E7  5130 00 00 00 00 00 00 00 00 F0  5130 AA AF 0E AA AA 0E AA AA 06
5100 00 3E AA 00 3A A6 00 3A A0  5140 00 00 00 00 00 00 00 00 F0  5140 0E AA AA 0F AA AA 03 AA E7
5110 55 00 3A 55 00 FA 05 00 C6  5150 A0 00 00 AB 00 00 A0 C0 04  5150 A6 03 AA AA 03 EA AA 00 27
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5130 03 EA 55 03 AA 55 03 AA 40  5170 C0 00 AF C0 00 0F 00 00 57  5170 00 3E AA 00 0F AA 00 03 00
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5160 04 AF C0 00 00 C0 40 AA 0C  5100 00 00 00 00 00 00 00 00 20  5100 AC AE AA AC FE AA 3C FA 64
5170 F3 05 AA 0F 10 AA AE 54 35  5110 00 00 00 0E 00 00 00 00 30  5110 AA 30 AA AA 30 AA AA 30 :12
5180 A6 AA 00 55 AA 01 57 AA 52  5120 00 00 00 00 00 00 00 00 30  5120 AA AA 00 AA AA FE AA AA 76
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5100 6A C0 55 EA C0 A5 AA C0 30  5140 50 0E AA 30 3A AA AC 3A 74  5140 AA 00 AA AF 00 AA AC 00 FD
5110 A5 A0 C0 AA A0 00 AA A0 EC  5150 AA AC 30 EA EC F0 70 7F 0C  5150 AA 3C 00 AA F0 00 AF C0 33
5120 00 AA A0 00 AA AF 00 00 79  5160 F5 E0 5F F0 70 7F 7F E0 00  5160 AA FF 00 F0 00 F0 00 00 A6
5130 0E AA AA 0E AA AA 0F AA 5F  5170 FE EA AA AB EA AA AB EA 64  5170 00 00 F0 00 00 F0 00 00 78
5140 AA 03 AA AA 03 AA AF 03 00  5180 E0 AA 3A 0E AC 3A AA AC 90  5180 F0 00 00 F0 00 03 AC 00 7E
5150 AA AF 03 EA AF 00 EA AA 12  5190 3A 0E AC 0E AA 00 0E AA 05  5190 03 AC 00 03 AC 00 03 AC 00
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5170 AA 00 EA AA 00 EA AA 00 12  5110 00 00 FF FC 03 00 03 FF 12  5110 0E 56 00 0E 56 00 0E 56 E2
5180 FA AA 00 3A A0 00 3A AF 03  5120 C0 03 FF C0 3F FF FC 3F 5C  5120 0E 56 00 0E 56 00 0E 56 E5
5190 00 3A AC 00 3E 0C 00 0F 7E  5130 00 E0 70 30 E0 7C 3F FF 5C  5130 00 0E 60 00 0E 60 00 3A 25
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5110 AA AC 00 AA AF 00 AA AA 13  5150 AC 3A 0E AC 3A AA AC 4F  5150 00 3A 60 00 3A AC 00 3A E5
5120 AA AA AA C0 AA AA C0 AA 30  5160 3E 3E 30 0E AA 00 0E AA A6  5160 AC 00 35 AC 00 35 AC 00 59
5130 AA C0 AA AA C0 AA AA C0 42  5170 00 03 AA C0 00 FF 00 00 66  5170 E5 AC 00 E5 00 00 E6 00 6F
5140 AA A0 C0 AA A0 00 AA AF 75  5180 00 FF AA 0F AA F0 3A AA D2  5180 E5 00 E5 00 03 A6 00 03 5A :03
5150 00 AA AC 00 AA AC 00 AA 22  5190 AC EA AA AB EA AA AB 39 F5  5190 00 03 5A C0 0E 5A C0 0E 00
5160 EC 00 EA 00 00 FE 00 00 26  5100 AA 6C 38 69 6C 00 55 78 DE  5100 6A 00 3A 60 00 35 AC 00 37
5170 3F F0 00 03 C0 00 00 00 16  5110 00 07 70 3A 55 AC EA 56 52  5110 EA AC 00 EA 00 00 EA C0 00
5180 00 00 00 00 00 00 00 00 30  5120 AA EA EE AE EA BE AB EE 60  5120 3F 00 00 00 00 00 00 F6
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5100 00 00 00 00 00 00 00 00 40
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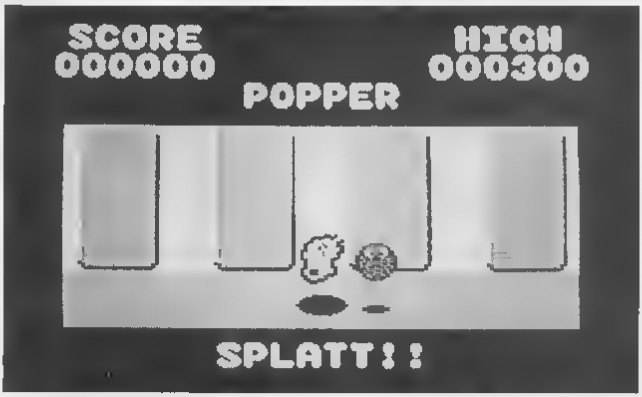

Contributions

So you own a Commodore? So you've written some programs? So why haven't you sent them to us?

You own a Commodore is always on the look out for new programs, hints and tips, articles and even regular series. In fact if you have something that you think could be of use to other Commodore owners we want to hear about it.

So if you have got something which you think we may be interested in. How do you go about submitting it to us?

Below you will find a list of guidelines that will help us to deal with any item that you send in to us. We don't expect everybody to be the next William Shakespeare but if you do follow these simple rules then it will make our job a lot easier.

1) If possible all material sent to the magazine should be typed or printed out on a computer printer.

2) All text should be double spaced i.e. there should be a blank line between each line of text. You should also leave a margin of about 10 characters around the text.

3) On the very first page you should put the following:
- Name of the article
- Machine that it is for
- Any extras required – disk, printer etc.
- Your name
- Your address
- Your telephone number

4) The top of every page should have the following information on it:
- Abbreviation of the article title
- Your name
- The page number

For example, suppose you had submitted an article on C64 interrupts. You should put something like the following at the head of the page:

Interrupts/J Smith/1

5) Please make sure that you do not make any additional marks on your text, especially underlining.

6) Try and write in clear concise English. It does not have to be a work of literature but it must be comprehensible.

7) On the bottom of each page you should put the word MORE if there are more pages to the article or ENDS if it is the last page.

8) If possible enclose a listing of all programs.

9) Under no circumstances use a staple to hold the pages together. Use a paperclip instead.

10) Programs should be included on either disk or tape. Make sure that you SAVE two copies of every program so that we have a better chance of loading them if problems occur.

11) Programs under 10 lines can be included in the text. If your program is longer than this you must enclose a disk or cassette.

12) If your article needs any artwork then supply clear examples of what is needed. We don't expect you to be an artist but we do need to see what is required.

13) Photographs if necessary must be either black and white prints or colour slides. We can take shots ourselves so don't worry about this too much.

14) Submissions of any length are welcome. If you have a five line routine that you think may be of use to someone else we welcome it just as much as a full blown six part series.

15) Payment varies quite a lot and depends on quite a number of factors such as complexity of program, presentation of program, number of magazine pages it takes up etc. Payment is generally between £10.00 and £800.00.

16) All payments are made in the month that the magazine containing your article has appeared in print.

17) If we do find your submission suitable for inclusion in the magazine we will write to you giving the terms of publication, the rate of payment and an agreement form. Prompt return of this form will allow us to use your program as soon as possible.

18) If you want the program returning to you should we find it unsuitable for publication then you should enclose a stamped self addressed envelope.

19) The last and most important point to make is 'get writing', we are waiting for your articles.

Pirate Power

If you're a Basic programmer looking for new tools then this Basic Extension from Pirate Software may be just what you're after

By Evelyn Mills

Extension 64 is a program which will extend your Basic into a form which is both compact and efficient. Naturally you will require to restructure your ideas on programming, but commands have been streamlined to an extent which is quite remarkable. To select a random example from the 120 or so extra commands available, 'STIX 2 2' will give a joystick response on both the x and y axes.

On loading you will find that you have 30 plus K available for programming, the whole being entirely compatible with standard Basic if you so wish. Effectively, *Extension 64* is primarily intended to enable you to manipulate sprites and music with greater ease and this it most certainly does. There are of course, many other inbuilt features but these are the two which should impress you most.

You may be daunted by the Manual, however demos are available on both cassette and disk and, if you follow the MAZE Demonstrating through in the supplementary listing provided, you should get to grips with this incredibly simple program structure. Plenty of examples are provided in the Manual and the cross-references are good.

Sprites

So what does all this do? SPRITES may be animated with a one line command while boundary limits can be set to bounce your sprites around in a variable fashion. Up to 64 sprites may be displayed on the screen at any one time, working on a basis of seven sets and eight sprites. I would recommend that one set is sufficient for starters. Sprites may be rotated, flipped around, made to 'chase' each other (FLEE command!) or halted (HALTON).

In the event that you do not have a sprite generator, there is an excellent one provided which operates via keyboard or joystick. The SPREGEN (generator) has a very good screen display, allows for flipping, multicolour display and saves the data to tape or disk for recall if required. Data files may be created in this way. All of the functions and displays are well documented in the Manual, please take note of how to reload your sprite data!

Music

Now to MUSIC. In the demo section you will find a program called ROUND. The tone and quality of the music is excellent, let this demo run on until the music has finished and you will find a 'keyboard' with three Boogie Rhythms incorporated which can give you a lot of fun – full screen directions here.

To program music however, back to the manual, the main references to head for here are VOICE and PLAY, these sections contain full data on how to control waveform, modulation, frequency, synchronisation etc. To find out how to program such data and to output a one or three voice melody again refer to the demo programs. You will be surprised at the simplicity of operation.

Other Features

Now to the CHRGEN or character generator. This is a fairly standard procedure for redefinition of characters (nice and compact) and a full set of redefined characters may be saved and reloaded for further programming.

Hires graphics are not forgotten, line drawing, circling and boxing are all present, with a choice of modes, colour and pens. There are full instructions for a SPLIT SCREEN mode allowing multicolour bit map graphics and text to be used together.

I did say that there are over 120 commands – look up the Quick Reference Index and you will find them there. Print at, Color at, Shrinking, Scrolling, Restore to a line number (very useful), Screen blanking, Auto-numbering, Block deletion etc. Some things old and a lot new.

The most impressive feature of EX-64 is its compactness of commands, use it in conjunction with Basic and you have here a very powerful programming tool indeed to give you maximum effect with minimal effort. Remember that this a programmer's program.

Touchline
Program *Extension 64* ***Company*** *Pirate Software 24 Badger Lane Ingleby Barwick Stockton On-Tees Cleveland* ***Tel*** *0642 762540* ***Price*** *£7.95 tape £9.40 disk £17.95 cartridge*

Bare Facts

Inside the Commodore range of computers there are a variety of machine code routines that are available to the user We look at what they are and how to use them.

Whenever any action is taken on a Commodore computer an internal machine code routine actually handles the action For example there is a routine in the computers that prints out the character in the A register to the current output device

All of these routines sit in a Read Only Memory (ROM) inside the computer called the Kernal These routines are therefore referred to as Kernal Routines

Commodore in infinite wisdom, has placed the routines on each of their computers in the same area of memory obviously not all machines have the same routines but where they are the same they sit at the same place Knowing what these routines do and where they sit in the computer s memory is extremely important when writing machine code programs or transferring a program from one machine to another

Below you will find a complete list of all the major Kernal routines This should aid you in writing your own machine code programs and converting from one machine to another

ACPTR

Purpose Get a byte from the serial bus
Call address $FFA5
Output parameter A
Machines All

Whenever you wish to get data from the serial bus this is the routine to use This routine gets a byte of data and places it in the A register Before using this routine the TALK routine must be used to tell the device on the serial bus to send data If the input device requires a secondary command you must send this with the TSKA routine before using this one

BOOTCALL

Purpose Boot the disk
Call address $FF53
Input parameter X
Machine C128

When called this routine will boot any auto start disk that is in the drive The X register should contain the device number of the drive

C64 MODE

Purpose Enable the C64 mode
Call address $FF4D
Machine C128

A call to this routine causes a C128 in C128 mode to switch into C64 mode

CHKIN

Purpose Open a channel for input
Call address $FFC6
Input parameter X
Machines All

This defines a logical file for input The file must have already been opened by using the OPEN Kernal routine If you are wanting to receive data from somewhere other than the keyboard this routine must be called before using CHRIN or the GETIN routines Should you be using the keyboard then the calls to this and the OPEN routine are not required

CHKOUT

Purpose Open a channel for output
Call address $FFC9
Input parameter X

Similar to the above routine, however, this time the OPEN file is set up for output This routine is used before outputing data to any device unless it is the screen

CHRIN

Purpose Get a character from the input channel
Call address $FFCF
Output parameter A
Machines All

This routine gets a byte of data from a channel already set up as the input routine by using the routine CHKIN If CHKIN has not been used then all input is expected from the keyboard The data is returned in the accumulator

CHROUT

Purpose Output a character
Call address $FFD2
Input parameter A
Machines C16 Plus/4, C64 C128

This routine sends the character in the A register to the current output device The output device must have been set up using the OPEN and CHKOUT routines If these have not been used the data is sent top the screen

CIOUT

Purpose Send byte over serial bus
Call address $FFA8
Input parameter A
Machines All

This is the routine used to send data over the serial bus Before you use this routine the LISTEN routine must be used to tell a device to get ready to receive data Should the device use a secondary address then you should use the SECOND routine to send this

CINT

Purpose Initialize video controller and screen editor
Call program $FF81
Machines All

This routine initialises the video chips and the Screen editor On the C128 the function keys are set to their default values and the 40/80 key is checked to see which mode the video chip should be in

CLALL

Purpose Close all files
Call address $FFE7
Machines All

A call to this routine will close all open files A CLRCHN routine is also executed to reset all I/O channels

CLOSE

Purpose Close a specified file
Call address $FFC3
Input parameter A
Machines All

This routine is used to close a file after it is finished with The accumulator should be loaded with the number of the channel to be closed before calling this routine

CLRCHN

Purpose Clear I/O channels
Call address $FFCC
Machines All

Call this routine to clear all open channels and restore the Input/Output channels to their original default values If any open channels are set up as serial then an UNTALK is sent first to clear the input channel or an UNLISTEN is sent to clear the output channel

GETCONF

Purpose Get the configuration byte
Call address $FF6B
Input parameter X
Output parameter A

A table at memory location $FF6B is required for normal operation of the C128 The configuration index should be passed in the X register The configuration is returned in the A register

DLCHR

Purpose Copy the character ROM
Call address $FF62
Machine C128

A call to this routine causes the character set to be copied into the video display chips internal memory

DMACALL

Purpose Initialise external RAM components
Call address $FF50
Input parameter X
Machine C128

When you require direct memory access to external memory it must first be initialised with this routine The X register should contain the new configuration

GETIN

Purpose Get a character
Call address $FFE4
Output A
Machines All

If the input channel is the keyboard then one character is read from the keyboard queue and its ASCII value placed in the A register No characters in the buffer places a zero in the A reg If the input channel is serial cassette or screen then use the CHRIN routine

INDCMP

Purpose Compare the accumulator with memory in any bank
Call address $FF7A
Input parameters A, X, Y $02C8
Output parameters $05

To compare the contents of the accumulator with the contents of a memory location in any bank you should put the configuration index in the X register and the offset in the Y register Location $02C8 should hold the address of the zero page memory location that holds a pointer to the memory location that you wish to compare with

INDFET

Purpose Get a byte from any bank
Call address $FF74
Input parameters A, X Y
Output parameter A

This allows you to read the contents of an address in any configuration without having to change the actual memory configuration A pointer must be defined in a zero page

location that points to the address to be read. The A register should contain this address. The configuration index is passed in the X register and the offset to the zero page pointer in the Y register. The result is returned in the A reg.

INDSTA

Purpose: Store accumulator in any bank
Call address: $FF77
Input parameters: A, X, Y: $02B9
Machine: C128

This routine will store the contents of the A register in any memory configuration. The A register should contain the character to be stored. The zero page address where a pointer to the memory address is stored must be placed in number and the Y register the offset from the location that is in zero page.

IOBASE

Purpose: Define I/O memory page
Call address: $FFF3
Output parameters: X, Y
Machines: All

This routine sets the X and Y registers to the address of the memory section where the memory mapped I/O devices reside. You can then use this address with relative addressing to access the different ports in the necessary devices. The X register contains the low byte of the address and the Y register the high byte.

This routine provides a certain amount of compatibility between Commodore machines. If you call this routine and use relative addressing to address the registers in the I/O chips.

IOINIT

Purpose: Initialise I/O devices
Call address: $FF84
Machines: All

This routine initialises all input/output devices and routines.

JMPFAR

Purpose: Jump to any bank
Call address: $FF71
Input parameters: zero page 2 to 9
Machine: C128

This routine enables a jump to another routine in any bank. Parameters are passed through memory locations 2 to 9.

JSRFAR

Purpose: Jump to a subroutine in any bank
Call address: $FF6E
Input parameters: Zero page 2 to 9
Output parameters: Zero page 2 to 9

This routine is used to jump to a subroutine in any bank. The parameters are passed in memory locations 2 to 9.

LISTEN

Purpose: Tell a device on the serial bus to listen
Call address: $FFB1
Input: A
Machines: All

This routine commands a device on the serial bus to get ready to receive data. The A register should be loaded with the device number before using this routine.

LKUPLA

Purpose: Search in table for logical file number
Call address: $FF59
Input parameter: A
Machine: C128

This routine searches in the table for the device and secondary address of the logical file specified in the A register. If the file is found then carry is cleared. A register contains the file number, X holds the device number and Y holds the secondary address.

LKUPSA

Purpose: Search for secondary address
Call Address: $FF5C
Input parameters: Y
Machine: C128

The specified secondary address (in the A reg) is searched for in the table of OPEN files. If the search success the carry is cleared and the A register will contain the File Number and the X register the device number.

LOAD

Purpose: Load from device
Call address: $FFD5
Input: A, X, Y
Machines: All

This routine LOADs data from the specified device. The Accumulator should be set to a zero if a LOAD is to take place or a one should you require a verify. If you OPEN the file with a secondary address of 0 the X and Y registers should contain the start address for the LOAD. If the secondary address is 1 then the data is LOADed into the area of memory that it was SAVEd from.

Before you use this routine you must have called the SETLFS and SETNAM routines.

MEMBOT

Purpose: Set bottom of memory
Call address: $FF9C
Input parameters: X, Y
Output parameters: X, Y
Machines: All

This is used to set the bottom of memory The lower boundary of the available memory is set with the two registers X and Y X is the low byte of the address and Y the high If the carry flag is set when a call is made to this routine the memory bottom is read and returned in the X and Y registers

MEMTOP

Purpose Set the TOP of RAM
Call address $FF99
Input parameters X, Y (carry clear)
Output parameters X, Y (carry set)
Machines All

When the carry is set the top of memory address is returned in the X and Y registers If carry is clear the top of memory is set to the address in the X and Y registers X is the low byte and Y the low

OPEN

Purpose Open a logical file
Call address $FFCO
Machines All

This is the routine used to OPEN a logical file Once the file is set up you can then use it for either input or output The SETLFS and SETNAM routines must be called before using OPEN

PFKEY

Purpose Define a function key
Call address $FF65
Input parameters A X Y
Machine C128

This is the routine to use if you are wanting to define a function key The zero page address that points to the text for the key should be placed in the A register The X programmed and the Y register should contain the length of the string

PLDT

Purpose Set cursor location
Call address $FFFO
Input parameters X, Y (carry clear)
Output parameters X Y (carry set)
Machines All

A call to this routine with the carry set will return the position of the cursor on the screen in the X and Y registers X holds the row number and Y holds the column Calling this routine with the carry clear will move the cursor to the screen position specified in the X and Y registers

PRIMM

Purpose Print out a message
Call address $FF7D
Machine C128

All characters following this call are sent to the current output device until a zero byte is reached The program then continues normally

RAMTAS

Purpose Perform RAM test
Call address $FF87
Machines All

This is the initialisation routine that sets up the zero page etc of the machine This is sometimes called a warm start

RDTIM

Purpose Read system clock
Call address $FFDE
Output parameters A X Y
Machines All

This is used to read the system clock Three bytes a returned by the routine The A register contains the most significant byte The X register contains the next most significant and the Y register the least significant

READST

Purpose Read Status word
Call address $FFB7
Output parameter A
Machines All

This routine returns the status of the I/O devices in the A register This routine should be called and the status checked after the I/O operation

RESTOR

Purpose Initialise the system vectors
Call address $FF8A
Machines All

This routine sets up the default values for all of the computer's system and interrupt vectors

SAVE

Purpose SAVE memory to a device
Call address $FFD8
Input registers A, X Y
Machines All

This is the routine to use if you wish to SAVE a section of memory The device address, file name etc must be set with the SETLFS and SETNAM routines 128 owners must also set the bank with a call to SETBNK

The zero page address at which the start address of the area to be SAVEd is stored must be placed in the A register The end address of the area is placed in the X (low) and Y (high) registers

SCNKEY

Purpose Scan the keyboard

Call address $FF9F
Machines All

This routine scans the keyboard and checks for a keypress This routine is called by the interrupt handler It a key is pressed its ASCII value is placed in the keyboard queue

SCREEN

Purpose Return screen format
Call address $FFED
Machines All (but see 128)
Output parameters X, Y

This routine returns the format of the screen On a C64 this would be 40 columns in the X register and 25 lines in the Y register This routine can be used to determine what machine your program is working on

128 owners should note that this routine will get the size of the current screen window After the call the A register contains the maximum column number The number of lines in the Y register and the X register contains the number of columns

SECOND

Purpose Send secondary address for LISTEN
Call address $FF93
Input parameters A
Machines All

Use this routine when you wish to send a secondary address to an I/O device after issuing a LISTEN command When sending a secondary address down the serial bus the address must first be ORed with $60

SETBNK

Purpose Define memory bank for disk operation
Call address $FF68
Input parameters A, Y
Machine C128

You should call this routine before performing a LOAD SAVE VERIFY and OPEN command The configuration index of the filename should be placed in the Y register and the configuration index of the memory area to be processed should be in the accumulator

SETLFS

Purpose Set up a logical file
Call address $FFBA
Input parameters A X Y
Machines All

Use this routine to set the logical file number device address and secondary address The file number is passed in the A register The X register should contain the device number and the Y register the secondary address

SETMSG

Purpose Enable/Disable system messages
Call address $FF90
Input parameter A
Machines All

This routine controls the printing of error and system messages If bit 7 of the A register is set then error messages will be printed If bit 6 of the A register is set then system messages will be printed

SETNAM

Purpose Set up file name
Call address $FFBD
Input parameters A X Y
Machines All

This is the routine to use when you are setting up a file name for the OPEN, SAVE or LOAD kernal routines The A register should contain the length of the file name The X and Y registers should contain the address in memory where the name is stored X is the low byte and Y the high 128 owners must also use the SETBNK routine to specify the bank to be used

SETTIM

Purpose Set the system clock
Call address $FFDB
Input parameters A, X Y
Machines All

The internal 'jiffy' clock can be set by this routine Before calling this routine the A register should contain the most significant byte the X register should contain the next most significant and the Y the least

SETMO

Purpose Set the time out flag for the IEEE
Call address $FFA2
Input parameter A
Machines All

This routine saves the value passed in the accumulator as the timeout flag for the IEEE routines Bit 7 of the accumulator should be set to 1 for timeouts to be effective

STOP

Purpose Check if the STOP key is pressed
Call address $FFE1
Output parameter Zero flag
Machines All

This routine checks to see if the STOP key has been pressed since the last IRQ call If it has then the zero flag will be set In addition the CLRCH routine will be called

SWAPPER

Purpose Switch between 40 and 80 columns
Call address $FF5F
Machine C128

A call to this routine will cause a toggle between 40 and 80 column modes of operation

TALK

Purpose Tell a device on the serial bus to talk
Call address $FFB4
Input parameter A
Machines All

When you want a device on the serial bus to TAK you must call this routine with the device number in the A register

TKSA

Purpose Send a secondary to a device that is commanded to TALK
Call address $FF96
Input parameter A
Machines All

This routine will transmit the secondary address contained in the A register to a TALK device

UDTIM

Purpose Update the system clock
Call address $FFEA
Machines All

This routine causes the system clock to be updated It is normally updated by the interrupt every 1/60th of a second

UNLSN

Purpose Send an UNLISTEN command
Call address $FFAE
Machines All

A call to this routine will tell all devices on the serial bus that are listening to stop receiving data

UNTLK

Purpose Send an UNTALK command
Call address $FFAB
Machines All

A call to this routine will tell any devices that are set to TALK to stop transmitting data

VECTOR

Purpose Copy or reset the system vectors
Call address $FF8D
Input parameters X Y (carry clear)
Output parameters X Y (carry set)
Machines All

Calling this routine with the carry bit set stores the current contents of the RAM vectors in a list pointed to by the X and Y registers Calling this routine with the carry bit clear causes the RAM vectors to be copied from the area pointed to by the X and Y registers

In Bare Facts we are attempting to provide you with the necessary information to make writing machine code programs and transferring macine code program from one machine to another If there are any specific areas that you would like us to consider for inclusion in this section of the magazine then please write to us at

Bare Facts
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However we must stress that all we are asking for is particular subjects that you require information on We can not endeavour to covert or write your programs for you

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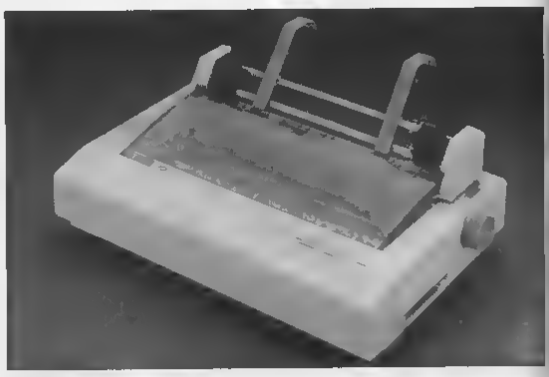
B A E A K

Printer Winner

The winner of our December competition was Graeme Gibson, from Pity Me in Durham. He has won a Citizen *120D Dot Matrix Printer* worth £197 excluding VAT. A Commodore printer interface is also being included so that the printer is ready for immediate use. Congratulations Graeme!

Congratulations!

The first prize winner of the CRL Nu-Wave competition was Brian Osborn of Kirkintilloch who receives a superb package of a signed Tubular Bells album, a copy of the video and the computer program. The 29 runners up prizes of the program go to D J Arnett, Swindon, Henry Topham, Silsden Keighley, W H Cox, West Lynn, Stephen Smith, Burnham, Mr F G Bullimore, Paignton, Ann Palmer Stalham, C M England, Cheadle Hume, Tracy Roche, Poole, Mr R Lucia Harlow, Mark Winfield, Normal Hill, Julian Fagandini, Dulwich, J Harper, Belfleet, Mr R Gillings, Portsmouth, Andrew Fairbrother, Frinton-on-Sea, Ian Hallam Havant, Peter Ovenden, Somerset, H J Bleumink, The Netherlands, D Derrick, Cheddar, Ian Horn, Colchester, Mr J Gubbins, Aldershot, Mr D Taylor, Isle Of Wight, Maureen James, Durham, Michael Treacy, Co Limerick, P A Hardy, Farnborough, Stephen Holliday, Chorley, Anthony Grist, Hove, Steve Skinner, Nottingham, Simon Thurman, Birmingham.



Oops!

In our February issue, there were some confusing line numbers in the *Word Pro Add On* article for the Plus/4. There was an assembly listing omitted from the article and although this is not necessary when you want to type in and run the program it may be quite useful to those of you who are interested in exactly how the program works. Therefore, if you want a copy of the listing, please send an s a e to Word Pro Listing, *Your Commodore*, 1 Golden Square, London W1R 3AB.

Also in the February issue there is a stray characters in two lines of Adventure Aid Graphics (p 90). The line should actually read

```
360 IF1$="\" THEN C3=C3+1  SYS SA
+6,C1 C2 C3 GOTO130
420 PRINTTAB(26)"LMUSONJHCRUSOFF
2    (YELLOW-SPOUND,WHITE)
```

We apologise for any inconvenience which these slight errors may have caused to our readers.

Hex Data Entry

We have had a number of calls from people who are having problems getting the [REV H] and [REV SN] in line 30. These should appear in the listing as a reverse H character and a reverse shifted N. In the LISTINGS article we explain how to get a [REV T] character, follow the same procedure for these. It appears that a dot has disappeared in some copies of the magazine. Line 540 should have [LEFT3]..[LEFT2] within the quotes.

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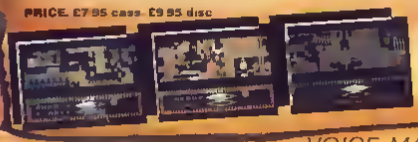

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